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BOLD POLICY REWARDED

THE opportunity to design and lay out an entirely new gas-works comes, in the present stage of development of the Industry, to very few engineers. That it fell to the lot of Mr. T. R. Cook was due to the enterprising spirit of that most enterprising of English seaside towns, Blackpool where it was decided some years ago that the gas-works should be removed from the far too central position it now occupies, incidentally impeding the development of a great new railway station worthy of the astronomical proportions of the tourist traffic with which it must deal, to a site where the works could expand without restricting the development of other amenities. As Mr. Cook put it in the Paper he presented to the Institution of Gas Engineers in 1940, the removal scheme was "just one more instance of the bold and far-sighted policy of those responsible for the local government and development of Blackpool." In that paper he described the new works at Marton and discussed the events leading up to the scheme and the reasons for the selection of the site. In his Presidential Address to the Manchester District Association — published in the "JOURNAL" last week—he rendered an account of nearly seven years' working.

So long as the Gas Industry remains a two-fuel industry, works will be built sufficiently near to, if not within, the area in which not only gas but coke is to be supplied. And in such a location the gas-works built on bare utilitarian lines will no longer be tolerated. The public will insist that the works shall not be an eye-sore. And if there was any doubt whether it need be so, Marton stands to remove it. The modern enclosed systems of carbonization, of which the continuous vertical retort is the usual form, have obviated some of the more objectionable features of gasmaking plant.

The modern retort house with its attached coke grading and storing plant can be built on lines which satisfy the best architectural taste in industrial structures. The gasholder certainly still presents an unsolved problem, but all the rest of the plant can be enclosed in buildings whose appearance need not clash with those of neighbouring works and factories, while methods are available for the reduction of whatever dust and odours are inseparable from the handling of considerable quantities of coal, coke, and purifying materials. Marton is justly claimed as "a distinct advance in the architecture of gas-works plant."

Turning to the record, it was fortunate indeed that the demolition of the Princess Street Works was not proceeded with, for from 1941 onwards refugees from the air raids, the personnel of Government departments, and R.A.F. trainees flooded the town with a great influx of temporary population which, with the increase of industrial consumption, caused an increase in demand of 500 million cu.ft. per annum over the requirements of 1939. The repair of Princess Street was undertaken in the first place to provide an alternative to Marton in case of damage by enemy action. The resumption of manufacture there enabled this enormous increase to be met without further capital expenditure—an example of foresight and promptitude in action of which the management may well be proud.

Two features of the Marton plant are selected for comment—the steam and power supply and the coke screening and storing plant. Power is generated on the works by steam raised either by surplus heat from the retort benches or by coke breeze consumed in "Dri-back" boilers. Pass-out engines are used, exhausting steam at 25 lb. pressure for process work. An alternative power supply from the grid is provided for, but electricity appears to be generated on the works at not more than 0.25d. per unit. A feature of the coke plant is the generous provision of 1,000-ton storage above ground—a very close and satisfactory estimate since only on one occasion has it been necessary during the six years to put down some 3,000 tons on the yard store. The low cost of maintenance of the screens and inter-connecting conveyors, just under 2d. per ton of coke handled, is also to be noted. Mr. Cook remains an adherent to the policy of selling coke as free as possible from moisture, breeze, and dust, and suggests that such a policy should be encouraged by permission to charge higher prices for coke with a higher carbon content—in other words, prices on a calorific value basis.

Mr. Cook concluded his Address with a number of general observations. We hope he is correct in thinking that the Ministry is convinced that the direction of coals suitable for carbonizing to carbonizing plant is in the best interests of the country. And we suppose we must agree, however ruefully, that compared with other countries we have good cause to be grateful that our fuel position is no worse than it is. For the present, improvization may be necessary, but it is time that an overall fuel policy was worked out. Nationalization he dismissed in a few words, of which the most significant were: "Very careful planning will be required if mistakes are to be avoided." His praise for the Technical Press is gratefully acknowledged. They have always done their best to provide "that criticism without which no body of opinion can be entirely healthy." And we hope gas engineers will respond to his call to continue to provide the necessary data upon which alone intelligent criticism can be based.

Finally, we note Mr. Cook's commendation of the newly formed Gas Engineers' Guild and his generous recognition of the work put in by Sir Frederick West and his associates on both sides of the Industry in the formulation and advocacy of a scale of salaries for the chief executives and their immediate assistants. The scale is only likely to be universally adopted, and above all satisfactorily developed to meet the rising cost of living, if it is backed whole-heartedly by its beneficiaries.

LIGHT ON FACTS AND FIGURES

INVENTIVE progress on the manufacturing, distribution, and utilization side of the Gas Industry has been well matched by the adoption of modern methods in the accountancy and statistical departments. We hear comparatively little at meetings of gas engineers and managers about those sides of the Industry, and for that reason the Paper which Mr. J. D. Thomas gave to the Southern Association of Gas Engineers and Managers (Eastern District) last month was of unusual interest. Mechanized or electrical accounting systems are in themselves fascinating examples of modern invention, but there is much more in them than meets the eye. A few years ago we described an installation which at that time had revolutionized the billing department of the Croydon Gas Company. On that occasion little was said about the value of the system from the point of view of the compilation of statistics, but Mr. Thomas, in his account of the installation at Finchley, shows that probably the greatest boon of all is the ease with which his Company can obtain a complete statistical picture of its operations.

The manufacturers of the equipment—and we are not here concerned with the merits of any one particular system, for we have had the opportunity of seeing more than one—have made it their business not merely to sell machines but to render service. Before these different firms put in their plant at Croydon, Guildford, Finchley, and elsewhere, their own research departments made a very thorough study of the Gas Industry's special requirements, which are divisible into two parts, (a) a speedy, accurate, and legible billing system, and (b) a statistical structure that affords a background for income and expenditure analysis, market research, balanced sales effort, and economic price structure. They are to be complimented on the thoroughness with which they approached those problems and the facilities they offer for staff training and in other ways.

The North Middlesex installation serves some 32,000 consumers and has provided the Company with statistics which it would have been difficult, if not impracticable, to extract by non-mechanical means. By introducing the system in easy stages the Company carried out the transition without inconvenience and the staff soon became accustomed to the new regime. The system is elastic in regard to size of undertaking and the extent to which results may be classified, and Mr. Thomas gave some indication of ways in which quite small undertakings might avail themselves of the service.

However perfect a mechanized system may be, it remains but a means to an end ; it cannot be an end in itself. Where the machine leaves off the human element takes over, and its real value will be reflected only in the interpretation of its results, in their use as a basis for improved economy in administration, tariff building, load factor investigation, and all the other things that go to make a perfectly balanced enterprise. When fuel is no longer in short supply gas sales campaigns can be planned scientifically on the basis of the analyzed statistics. For the present those statistics can be used to no less advantage as a means of sales control. In bad times as well as good, therefore, mechanized accountancy places at the disposal of the Industry a foundation on which to build a wisely planned sales structure.

INTERPRETATION OF RESEARCH

IN our issue last week we commented on the need for a better interpretation of research ; we now pursue the point —and all will agree that it is important—a little further. Now the onus for interpretation of the results of scientific research is not wholly upon the research men. It is inevitable that words of more than one syllable must be used unless the explanation is to be laboured and tiresome, not to say of length even greater than those of many rather wearisome research reports that have been issued in past years. Those who aim to occupy positions of responsibility in the Gas Industry must equip themselves to understand the matters that are explained to them, and with which they will be expected to deal. Mr. Geoffrey Heyworth, in his recent Address to the Institution of Chemical Engineers, made the same point that the non-technical men to whom research reports are addressed must become conscious of their own shortcomings and study how these can be rectified. In the Gas Industry the engineer must meet the research man halfway. It might not be too much to suggest that in the future ability to do so may well be regarded as a *sine qua non* of a competent gas engineer. Not so many years ago, the greater part of the nation was unable to read or write; lack of ability to do so was no handicap in earning a living by the purely manual work that the tradesman of those days performed. To-day, inability to read or write would condemn a man to occupy a very humble position indeed. The same is true of higher education; in the future inability to understand the language of science may well preclude a man from occupying managerial positions.

Of deeper import is the demand that the Gas Research Board should pursue research of a character different from that on which it is now engaged. The Board is urged to "follow a humbler and more constructive course on problems that will evolve a more factual knowledge on things in keeping with the common touch." It is at the outset a little difficult to know what course it is suggested that research should take unless specific examples of research problems are put forward. There arise from time to time difficulties in specific directions in every undertaking, but these difficulties are not necessarily subjects for "research." It is unfortunately true that "research" is a much misunderstood term. The popular Press is prone to describe every application of the scientific method as "research." Let there be found a deposit blocking a pipe, let that deposit be handed to the chemist to see what he can make of it, and that simple piece of work will be immediately dubbed as "research." It is, of course, nothing of the kind ; it is routine work for the chemist to analyze the deposit and to make a guess how it arose. Many of the difficulties on which some people would like to see research carried out are nothing more serious than can be resolved by the aid of the Regional Gas Engineering Advisory Boards or of a competent chemist or physicist, according to the nature of the problem. The boundaries of knowledge are wider than is often supposed, and many apparently serious problems could be resolved by putting them to the Gas Research Board who could give the answer without requiring to do any experimental work.

TWO CLASSES OF PROBLEM

THERE remains, however, a hard core of problems that require to be tackled by skilled scientific workers. These again can be divided into two classes. One is the day-to-day problems that arise in any specific works in which gas and coke are made or used, It might well be suggested that these problems should not occupy the attention of a research organization set up and paid for by the whole Industry. Self-help, though seemingly unpopular to-day—we will not go into the causes of this—is still a guiding principle in industry. The individual works should do something to solve its own problems, and these problems may not necessarily be of sufficient interest to the Industry as a whole to justify spending the time of the limited research staff available at headquarters.

In the same category comes research on plant design. There might arise, for example, a demand that work should be done to elucidate certain principles in the design of condensers or gas washers. A great deal of quite elaborate work

has been published on both these subjects and the principles of counter-current extraction, for example, have occupied the attention of chemical engineers for some time. The fact is, however, that the Gas Industry possesses plant that is operating well, thanks in no small measure to the skill of the chemical engineers attached to constructional companies. Work on plant design in general can to a great extent be left to the designers of plant—with, as a necessary corollary, the collaboration of users. The present highly efficient coal carbonization systems have been built up from small and crude beginnings in this way. It is doubtful whether all the research that could have been done by any Board would have produced a better result in a shorter time. This is one of the outstanding merits, and achievements, of private enterprise. Competition is an essential spur to technical advancement.

There remains the problem of what work should be done by the Research Association of the Industry. In general, it is inadvisable that research should be conducted on a number of unrelated problems as they happen to crop up. Sometimes this is unavoidable; not every problem of importance can be related to an organized plan. There should, however, be, behind the whole mighty maze, a common plan. The amount of work that can be done by a central research organization is limited, and problems must therefore be carefully selected. The collection of essential data, which may involve careful test runs on industrial plant, comes within the category of work that can be done only by a research organization equipped for the task. Such work provides the data on which designers can base their plans. From among the many problems that face the Gas Industry on the production, distribution, and utilization sides there will stand out a limited number which concern large sections of the Industry and which should therefore be investigated. Whether they will be tackled at once or later depends upon the facilities available and the comparative urgency of the problems. It is, we must suppose, these problems to which Mr. J. M. Dow, in his Presidential Address to the North British Association of Gas Managers, has referred as "problems that will evolve more factual knowledge on things more in keeping with the common touch." It would be well, however, if specific examples could be given of the problems that practical gas engineers feel should be investigated by the Board. Many such subjects are under investigation by the British Refractories Research Association in collaboration with the Gas Research Board. The annual report of the Board contains many references to work in progress which might be put in this category. The survey of gas quality, work on the organic sulphur compounds of coal, heating and drying by radiation, the combustion characteristics of gases, the measurement of the radiant efficiency of gas fires—all are subjects of immediate import to the Gas Industry and are likely to lead to advances in technical progress in the immediate future which will have an important bearing on the service that the Gas Industry can render to the community.

What Mr. Shinwell Said

Commenting on the reported statement of the Minister of Fuel and Power that he hopes to place the Gas Industry under public ownership this year, Mr. J. R. W. Alexander, General Manager of the British Gas Council, said it would be almost impossible and certainly unjustifiable to pass a Gas Nationalization Bill through its several Parliamentary stages within the next eight months. Such a course would prejudice adequate consultation between the Ministry of Fuel and Power and the British Gas Council and it would preclude proper consideration by Parliament of a legislative measure of vital concern to the Nation.

Personal

Mr. H. S. VALENTINE, of Scarborough, who has represented R. & A. Main, Ltd., in the North Eastern Area of England for the last 27 years, is retiring on May 31. His place will be taken by Mr. R. G. PAYNE, who has already commenced his duties on the area.

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Mr. S. R. BENNETT, Sub-area Manager of the Malton (Yorks) Gas Company (one of the York and Harrogate District Group), has been appointed Engineer and Manager of the Bridgnorth Gas Department, in succession to Mr. E. H. Hart, who has gone to Keighley. Before going to Malton, Mr. Bennett had held posts in the Gas Industry at Nelson, Blackpool, Preston, and York.

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Mr. CHARLES A. E. REED has been appointed Chief Technical Assistant Engineer to the Hampton Court Gas Company. Before taking up his duties at Hampton Court, Mr. Reed was Chief Assistant Engineer to the Weymouth Consumers Gas Company, having held that position for nine years. He started his service in the Gas Industry with the South Shields Gas Company.

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Mr. W. T. GARDNER retired from full time service with the Woodall-Duckham Company on April 30, and at the same time resigned from the Board of Directors. He will act as consultant to the Company on refractory materials for a further period. Mr. Gardner joined the staff of the Company in 1912 and was previously Chief Chemist of the Bournemouth Gas and Water Company from 1904. He has thus been associated with the evolution of continuous vertical retorts from the beginning and is well known in the Gas Industry through his long service as chief of the Company's operating staff, which position he held until 1930.

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Mr. C. M. PLOWMAN, Hon. Secretary of the London District Executive Board of the National Gas Council, the District Committee of the Federation of Gas Employers, and the London Regional Joint Industrial Council, for the past 28 years, has found it necessary to resign owing to his increasing duties as National Secretary of the Federation of Gas Employers and Employers' Secretary of the National Joint Industrial Council for the Gas Industry. Mr. FRANK L. FFOULKES has been appointed full time Secretary of the London District Committees of the British Gas Council, the Federation of Gas Employers, and the Employers' Side of the London Regional Council for the Gas Industry. Mr. Ffoulkes, who took up his duties on April 1, was previously with the Shipbuilding Employers' Federation, with whom he had been, but for his war service, since 1935. He is an Associate Member of the Chartered Institute of Secretaries and saw service in India, Burma, and Siam in the Army during the war, retiring with the rank of Major.

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Mr. A. R. TURNER has been appointed Assistant General Manager to the Bedford District Gas Company. He was educated at Bedford School, served his articles at Bedford under Mr. J. B. Hansford, and became Assistant to the Boston Gas Light and Coke Company in 1938. In January, 1940, he volunteered for Army service and took a commission in the Devonshire Regiment. During his six years' service, he had a variety of appointments and commands, his first being the command of an infantry company in 1941. In the next year, he became an instructor and was later made Commandant of the G.H.Q. Street Fighting School until it was disbanded in 1945. Following this, he attended a short staff course at Camberley and was given a staff appointment at a Divisional Headquarters, an appointment which he held until his posting to Germany. While in Germany, he was on the staff of the Control Commission, where he assisted in reorganizing the German Gas Industry. From his demobilization, in April, 1946, until taking up his new appointment, he was at the head office of the United Kingdom Gas Corporation.

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Mr. W. S. JOHNSTON, who, as reported in the "JOURNAL" of Mar. 5, has been appointed Engineer and Manager of the Dundee Gas Department, took over his duties on May 16, when the retirement of Mr. James Dickson took effect. A native of Dundee, Mr. Johnston was educated at Dundee High School and Dundee University College, where he graduated B.Sc. (Eng.). Joining the Dundee Gas Department in 1924 as an apprentice engineer, he went to the drawing office in 1926 and was appointed first technical assistant in 1933. He became Assistant Engineer in June last year. During the war he held a commission in the Royal Engineers, attaining the rank of Captain. His father was for many years Chief Clerk in the Department, and retired in 1936.

News in Brief

Middlesbrough Corporation has accepted the tender of Ashmore, Benson Pease & Co., Ltd., Stockton-on-Tees at £112,750 for the erection of a purifying plant at the gas-works.

The Annual Luncheon of the Yorkshire Gas Coke Association will be held at the Great Northern Station Hotel, Leeds, on May 29. The guests will include Colonel H. C. Smith (Chairman of the National Federation of Gas Coke Associations), Mr. J. W. Beaumont (Deputy Chairman of the National Smoke Abatement Society), and Mr. W. G. Davies (City Architect of Sheffield).

Glasgow Corporation wants to be able to retain some measure of control over its own gas undertakings if and when the Government nationalize the Gas Industry. Councillor John Storrie has given notice that, at the next meeting of the Corporation Gas Committee, he will move: "That arising out of the Government's proposals for the nationalization of the Gas Industry, the Corporation seek consultation with the Ministry of Fuel and Power regarding regional control which may arise affecting Glasgow."

The Sheringham Gas and Water Company opened a new showroom in Church Street, Sheringham, on April 16. The premises have been completely redecorated, a new wood block floor has been laid, and a built-in kitchen unit supplied. The company considered having a showroom before the war, but no plan materialized. The only existing showroom was at the gas-works, but it was quite unsatisfactory and it was impossible to show appliances to advantage.

During a Thunderstorm at Blackpool in the early hours of May 14 residents heard their houses rattle after a loud report "just like a bomb." It was found that a 12 in. gas main, laid in readiness for extensions and not filled with gas had been struck underground and split for a length of 12 ft. Close to the smashed pipe was a 6 in. main filled with gas. Workmen found marks of burning on the ½ in. thick cast iron main. Mr. W. Dabbs, Mains Foreman, said in 30 years' experience he had never seen anything like it.

Mr. J. W. Pallister, Engineer and Manager to the Middlesbrough Gas Department, in a report to the Town Council stated that at the present price of gas there was likely to be a substantial deficit at the end of the year. The rising demand for gas would necessitate continuous and costly use of the carburetted water gas plant, which, allied to higher costs of materials and improved workers' conditions, would seriously affect the undertaking's finances. Mr. Pallister is to submit a detailed report on the position to the Gas and Electricity Committee.

Mr. Robert P. Russell, President of the Standard Oil Company of U.S.A., will give the first of a series of lectures on the Organization of Industrial Research, arranged by the F.B.I. Industrial Research Committee, in the F.B.I. Council Room, 21, Tothill Street, S.W.1, on June 9, at 6.15 p.m. Mr. Russell, who will be visiting this country to deliver the Cadman Memorial Lecture, was awarded the Medal for Merit, the highest U.S. award to a civilian, for outstanding services to the scientific side of the war effort. Sir Frank E. Smith will take the chair. Admission is free; tickets from the F.B.I. Industrial Research Secretariat.

The Association of Supervisory Staffs, Executives, and Technicians, has just published a pamphlet bearing the title "A National Charter for Supervisors and Technicians." The charter envisaged demands that all supervisors employed in industrial undertakings should be paid a minimum salary of £500 per annum. The contention is made that the majority of foremen are being underpaid. The Association aims to secure a standardized minimum salary with additional bonuses based on length of service and number of staff supervised. The claim is also made that employers should recognize the status of foremen. In some firms, the Association maintains, the prestige of the supervisor has been lowered by shop stewards and higher management, reaching decisions without any consultation with the supervisory staffs. Copies of the pamphlet can be obtained free of charge from the General Secretary, A.S.S.E.T., 150 ,Southampton Row, London, W.C.1.

Development of Gas Production and by-product processing is proposed by the Scottish Reconstruction Committee, a leading Scottish commercial and industrial group, using indigenous peat as the basic fuel. The Committee is holding a conference shortly, to be attended by industrialists, commercial interests and scientists interested in the production of peat and peat products. The proposal involves the establishment in Lewis, where peat bogs extend to nearly 30,000 acres, of 20 ft. deep, of a distilling plant and power station where peat could be processed to give gas, peat charcoal, and by-products. It is not suggested that the proposed industry can be developed without considerable difficulty, and the problems are fully appreciated. It is felt, however, that previous neglect of the peat reserves in Britain, estimated at something like 1,000,000,000 tons in Scotland alone, has resulted from the availability of very cheap coal. The removal of that factor makes the present working of peat the more vital.

Provisional Agreement has been arrived at for Spalding Gas Department to supply gas in bulk to the Long Sutton and Sutton Bridge Gas Company for 10 years with an option to renew for a further ten years.

Stalybridge Gas Department has just demolished its "A" bed of intermittent vertical chamber ovens built by Gas Chambers and Coke Ovens, Ltd., in 1934-5. With the exception of a few hours for patching, this bed has been working continuously for 4,254 days. The average thermal yield last year was 73 therms per ton.

The First of a Series of talks and practical demonstrations to the fittings staff of the Eastbourne Gas Company was given during the period April 28 to May 1 by Mr. A. A. Bishop, of Bratt Colbran, Ltd. This will be followed by similar talks arranged with the co-operation of Radiation Ltd., the Sutherland Meter Company, and Ascot Gas Water Heaters, Ltd.

The Prime Minister, Mr. C. R. Attlee, is to open the Eleventh Public Works, Roads and Transport Congress and Exhibition, at Olympia, London, on July 21. The Minister of Health, Mr. Aneurin Bevan, as President of the Congress and Exhibition, will take the chair. Well over 1,000 delegates have been appointed by local authorities to attend the Congress and Exhibition, which have not been held since 1937. The Department of Scientific and Industrial Research is among exhibitors.

Over Sixty Members of the Western Home Counties Gas Salesmen's Circle attended a dinner by invitation of the Ascot District Gas and Electricity Company, Gas Department, at the Berestead Hotel, Sunninghill, on April 15. Mr. P. G. Wright, Slough, the Chairman, proposed the toast of their hosts, the Chairman and Directors of the Ascot Company, coupling with it the names of Mr. J. H. Dyde, a Director, and Mr. J. W. Kaye, Engineer and Manager. Mr. Dyde and Mr. Kaye replied. A novel feature of this meeting was the invitation of the salesman employed by the Electricity Departments of three undertakings in the Circle which provide both gas and electrical services (Ascot, Farnham, and Yorktown). Mr. I. H. Nelson, of the Ascot Company's Electricity Department, gave a talk on modern electrical equipment.

Diary

May 22.—Southern Association of Gas Engineers and Managers (Eastern District): County Meeting, Slough and High Wycombe.

May 22-23.—Eastern Association of Gas Engineers and Managers: Spring Meeting, Chelmsford.

May 28.—B.G.C. Domestic Development Committee, 2 p.m., Gas Industry House.

May 28.—Manchester and District Junior Gas Association and Yorkshire Junior Gas Association: Joint morning visit to Warrington Gas Department; afternoon visit to the works of the Richmonds Gas Stove Co., Ltd.

May 29.—Yorkshire Gas Coke Association: Annual Luncheon, Great Northern Station Hotel, Leeds, 12.45 for 1 p.m.

May 30.—Women's Gas Council: Annual General Meeting, Gas Industry House, 3 p.m. Speakers: Lady Nunburnholme, Colonel H. C. Smith, M. Milne-Watson, J. R. W. Alexander, and Miss K. M. Halpin.

June 2-5.—Institution of Gas Engineers: 84th Annual General Meeting, Birmingham. (For full programme see "JOURNAL," April 30, page 235.)

June 9.—London and Counties Coke Association: Technical Committee, 2.30 p.m., Gas Industry House.

June 10.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.

June 10.—National Federation of Gas Coke Associations: National Technical Committee, 11.30 a.m., Gas Industry House.

June 10.—Solid Smokeless Fuels' Federation: Technical Committee, 2.45 p.m., Gas Industry House.

June 11.—Yorkshire Junior Gas Association: President's Day, York. Inspection of works, 11 a.m. Afternoon visit.

June 11.—National Benzole Association: Annual General Meeting, Wellington House, Buckingham Gate, S.W.1, 3.45 p.m.

June 12.—Lancashire and District Coke Association: Annual Meeting and Luncheon, Grand Hotel, Manchester.

June 14.—London and Southern District Junior Gas Association: President's Day: Summer Visit to Portsmouth.

June 14.—Manchester and District Junior Gas Association: Ladies' Day. Morning visit to the works of General Gas Appliances, Ltd., Audenshaw; afternoon visit to Buxton.

Society of British Gas Industries

Forty-Second Annual Report

THE 42nd annual report of the Council of the Society of British Gas Industries records that Sir William Larke has succeeded Sir Francis Joseph as President. Mr. A. Watson has succeeded Mr. L. Bratt as Chairman of the Council and Mr. D. Rider has served as Vice-Chairman.

Legislation to nationalize the Gas Industry is foreshadowed to follow the Electricity Bill, which sets out to provide for the co-ordination under public ownership of the electricity supply industry in Great Britain. It is probably at least reasonable to assume that in broad outline the proposals for the Gas Industry will follow the lines of the Electricity Bill, namely, that there will be a Central Authority and Area Boards, but to attempt to pursue the analogy beyond general principles would be rather to ignore certain important differences in the organization and circumstances of the two industries. The Society is studying closely developments in connexion with the passage of the Electricity Bill, since in it there are a number of questions which by inference are of the greatest importance to the interests of the Society's members. The affairs of the Gas Industry are now concentrated in the British Gas Council, and the fact of the Industry having one central organization to speak for it at this stage represents an important development, since it is in a favourable position to exert all the influence of which it is capable on its own destinies.

Joint Consultation

Within the Industry the formation of the British Gas Council has not been without its effect upon the organized relationships between the undertakings and the Society representing contracting and manufacturing firms. For some time the British Gas Federation was regarded as the focal point for the internal activities of the Industry, but for a variety of reasons fulfilment had fallen very much short of promise, and indeed often a sense of frustration rather than of achievement had resulted. Seeking therefore to profit from experience, a close study of the position was jointly made by the Chairmen of the British Gas Council and the Society, and it was decided to choose a field of activity in which close consultation and co-operation were clearly needed for an attempt to devise machinery that would give effect to the strong mutual desire for harmonious and fruitful work. A Joint Consultative Committee for Domestic Uses of Gas was therefore created with approximately equal representation from both sides, the Committee being however given neither powers nor terms of reference. Regular meetings of this Committee have been held throughout the year, and the arrangement not only shows considerable promise for the future within its own sphere, but represents the establishment of a precedent for co-operative working of importance to all concerned. Negotiations are now in progress to explore the possibility of creating a similar Joint Consultative Committee to cover the industrial uses of gas.

The Society's relationships with the Institution of Gas Engineers continue on an entirely friendly basis and good work is being achieved by committees of that body on which the Society is officially represented, such as the Joint Lighting Committee and the Meters Committee.

Gas Research Board

S.B.G.I. members are fully alive not only to the value of scientific research but to the urgent need for its most efficient and widespread use. With the Institution of Gas Engineers the Society before the war sponsored the formation of the Gas Research Board, and now that the war is over the Society's members are taking the full share which it was their intention from the first to take in its work. The Society's nominees on the Council of the Board are participating actively in the direction of co-operative research, and the Society's members are contributing financially on a scale which is by common consent agreed to be commensurate with their stake and responsibility in the Industry. The lack of a scientific headquarters for the Board has been a serious limiting factor on development, and while it is hoped that this will now be remedied the problem in the meantime has been at least minimized by help and hospitality from university departments and from Industry. There is collaboration with other research organizations in the field of fuel and this will be further developed. Collaboration with Industry has also been maintained, and international collaboration is now gradually being renewed, many discussions having been held with visiting scientists to this country. It seems important that at this stage the Board's whole programme of research should be most carefully reviewed, so that balance and continuity in the light of the Industry's most pressing needs may be achieved.

The Society continues to maintain the closest possible contact with the various Government Departments responsible for the exercise of control over the various branches of activity covered by the Society's members, and the Council places on record its appreciation of the sympathetic understanding which has been shown in many directions and on many occasions by these Departments in relation to the Industry's problems during the year.

Increased Production

The extent to which peace-time productive capacity was diverted to war purposes or was reduced to a much lower level because of the war varied conspicuously as between different sections of the S.B.G.I., and progress towards the achievement of a reasonable balance in meeting the Gas Industry's needs, while notable, still falls short of requirements. For certain types of labour there is the keenest competition between various branches of industry, total supply being short of total requirements. In regard to materials, old shortages still remain and new shortages still arise. Delivery dates on many important items still lengthen. In all these circumstances there is if anything an increase in rather than an alleviation of the problems of those whose day-to-day task it is to produce goods in a balanced flow at economic prices, and constant resort has still to be had to improvization. Despite all the difficulties and uncertainties with which those engaged in the engineering industries have been faced, notable increases in production were achieved by S.B.G.I. members during 1946. The recent fuel crisis, however, caused a review of programmes throughout industry and the full effects of that crisis are as yet unpredictable, if for no other reason than that the ultimate and inescapable remedy of greatly increased coal production has still to be realized.

Collaboration with Gas Undertakings

There has been close collaboration with the representatives of gas undertakings in distributing the output, restricted as it has been, of gas appliances. A scheme for the operation of a priority system covering gas cookers, worked out jointly by the British Gas Council and the S.B.G.I. received the official sanction of the Ministry of Supply, and being operated under Ministry authority has proved of great value. More elastic schemes have been in operation for other appliances, all designed as far as possible to secure the necessary priority for manufacturers to acquire materials and to provide for the priority needs of the users in line with Government policy.

The Ministry of Supply have assumed responsibility for the exercise of a certain measure of price control in regard to all the requirements of the housing programme, including gas appliances. The Society, while not being itself a party in the negotiations, has throughout held a watching brief in this matter in the general interests of members. The Society has worked on many problems of common interest during the year with such organizations as the Federation of British Industries and the British Standards Institution.

Export Trade

The Gas and Coke Oven Industries Export Group, which the Society staffs and administers, has been in active operation throughout the year. The Group has three sub-groups covering respectively plant, appliances and meters. Important contracts have been obtained by Members of the Group both for gas-works and coke oven plants overseas, and it is confidently anticipated that further important work of this nature will be placed with contracting firms in this country. Inevitably though, with the demands of the home market as insistent and important as they are, no great expansion in the export business of the Society's members can as yet be undertaken. It is, however, important in the national interest that sufficient progress should be made with the programme for the home market for the export market to receive increasing attention, since only in this way can the valuable goodwill built up laboriously over many years be maintained. Overall export business passing through the hands of the Group increased materially during 1946 by comparison with 1945.

During 1946 plant, equipment, and appliances which the Gas Industry and the consuming public looked to the Society's members to supply came forward in increasing volume, but the prob-

lem remains that both for the home and export markets, production must be made competitive in price and design. The position regarding the supply of raw materials is very unsettled. Many of the present shortages are based not so much on actual supplies of raw materials as on the difficulties encountered in transforming the raw products into semi-manufactured goods. Owing to mal-distribution the shortage of manpower is most acute in certain key industries. Partly as the result of this shortage of manpower there is a continuing shortage of production. Every effort should be made to enlarge the total labour force and to ensure that the needs of key industries are met. Every effort should be made to increase incentive and perhaps particularly in removing taxation deterrents. A consistent wages policy should be formulated since a planned economy is impossible without a planned wages policy. The whole machinery of economic control should be reviewed and such controls as on examination are still found to be essential must be made to function smoothly and expeditiously. The position of the country is stated in a recent White Paper to be extremely serious, and now that this is officially admitted means must be found of closing the gap between supply and demand and between exports and imports in any and every way, except for the shortest possible period as an emergency measure, that of restricting demand and keeping down imports.

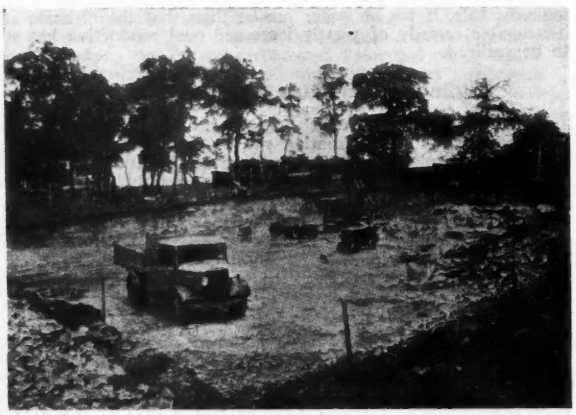
During the coming year the Government's plants for the future of the Gas Industry will presumably be revealed. Their effect on the affairs of the Society's members must inevitably in the long run be profound. The Council believes, however, that the work which the Society has sought in recent years to do as the medium of contact between Government Departments and its members has had important results. An atmosphere of confidence in the organization has been created. The Council hopes, therefore, as the Gas Industry enters upon a new phase in its service to the public, that the Society's services may be used where they can be of value to an Industry in which for over 40 years it has played its part. Such strength as the Society possesses can, however, be expressed in terms only of the extent of the loyal support it receives from its members. In the belief that it has this support the Council will seek to the best of its corporate ability to serve the interests of the members in the times that lie ahead.

New High Pressure Storage Station at Leeds

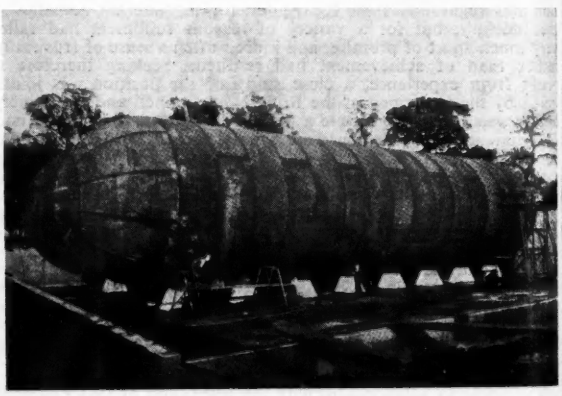
In the "JOURNAL" last week, p. 329, we reported the inauguration of the new high pressure storage station of the Leeds Corporation Gas Department at Fir Tree Lane, Moortown. We are now able to reproduce some illustrations of various stages in the construction of the station.

The new plant is in a residential area on the outskirts of the City, almost completely screened from view by trees, and is barely visible from the main Leeds-Harrogate road which runs close by. Capable of storing 500,000 cu.ft. of gas, this new station is part of a plan to supply suburban areas in Leeds, and when completed will be one of the largest in the country, with a capacity of 1,000,000 cu.ft.

The plant is entirely automatic, subject only to inspection by a maintenance engineer.



During the excavation for the receivers a considerable amount of rock was encountered which had to be blasted.



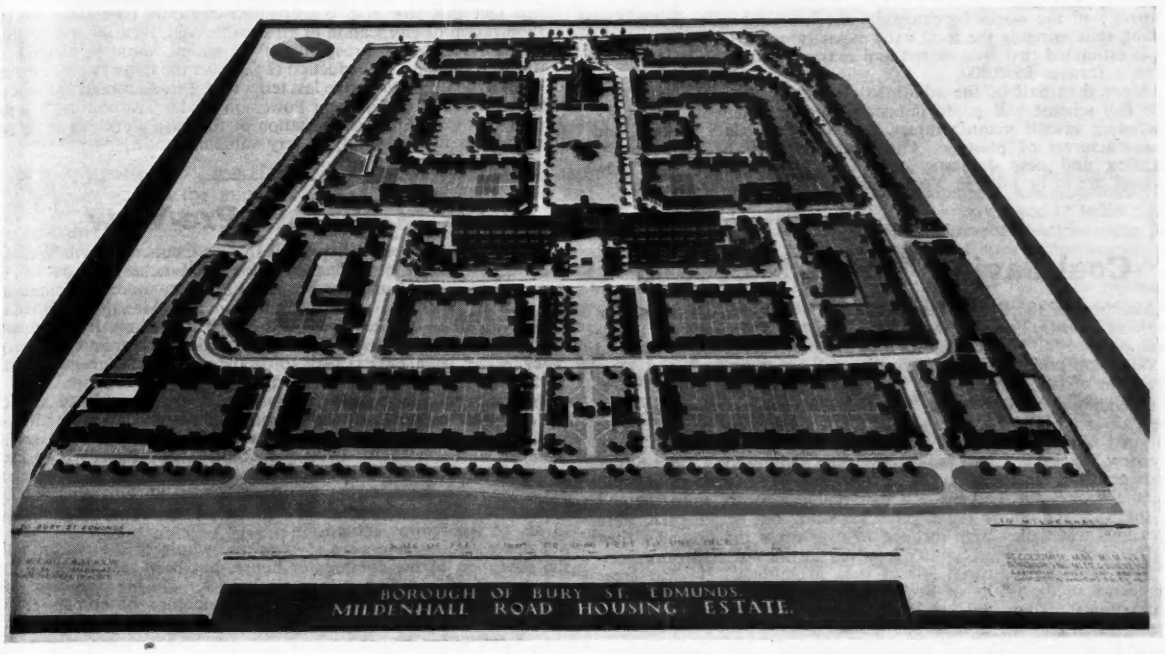
Two of the receivers in position and in process of being riveted.

This view shows water which was struck at a depth of 10 ft.

Concrete retaining walls, foundations, and stools for gas receivers.

Bury St. Edmunds Post-War Housing Estate

Mr. H. R. Thomas, Engineer and Manager of the Bury St. Edmunds Gas Company, writes: In 1943 the Borough Council decided to acquire a 78-acre site on the main Bury St. Edmunds-Mildenhall Road and preparations of engineering details were commenced by the Borough Surveyor of the first 26 acres in 1945 and in May, 1946, the proposals to carry on with the remainder of the site were approved. The estate when completed will hold 724 houses and I am indebted to the Borough Surveyor, Mr. N. C. Goldsmith, M.B.E., for permission to publish the accompanying photograph of a fine scale model made by his Department showing the layout of the estate when completed.



The construction of all roads is now completed and mainlaying by the Bury St. Edmunds Gas Company is well advanced. The roads are all of concrete construction and suitable main crossings have been laid in advance of the concreting. All roads have mains on each side laid in the verges or pathways. When completed the estate will have its own church, public house, nursery school, community hall, clinic, library, garages, bowling greens, tennis courts, shopping centre, pavilion, and maintenance depôt. Houses, so far erected contain three bedrooms, bathroom, living room, lounge, and kitchen, with a spacious brick out-house. The first 32 houses erected and occupied have been fitted with gas cookers and gas wash-boilers and piped for additional gas water heating if desired. Fire points have also been laid under the floors. Twelve of the houses, in addition to gas cookers and wash-boilers, have been fitted with instantaneous multipoint gas water heater for the supply of bath and wash-basin, and single-point instantaneous gas water heater in kitchen.

Of the 104 houses now under construction and erected, 74 will be fitted with gas cookers and wash-boilers with a possibility of gas water heaters later on. The whole of the houses erected or under construction are fully piped for gas and the Council have purchased through the Bury St. Edmunds Gas Company the whole of the gas apparatus installed in these houses.

In addition to the Mildenhall Road estate, 65 E.F.M. houses have been erected and occupied, and of this number 50 are all gas.

The British Gas Council's stand at the British Industries Fair showing (left) a double-cased internally-heated batch type drying oven by F. J. Ballard & Co., Ltd., a circular tempering bath by Askam, Ltd., and a lead melting pot with gas-fired immersion heater. A new development in gas-fired furnaces was shown (right) in the form of a permeable lined furnace by the Incandescent Heat Co., Ltd., with pyrometer control panel by Electroflo Meters, Ltd. Other exhibits in the picture on the right are a high speed steel furnace by Brayshaw Furnaces and Tools, Ltd., and a gas heated tank by Dowson and Mason.

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More Gas for York

The Ministry of Fuel and Power has approved the first part of a scheme prepared by the United Kingdom Gas Corporation with a view to doubling the supply of town gas in York. This provides for the immediate erection at the present York gas-works of two water gas plants with a combined capacity of 4 million cu.ft. of gas a day, which will bring the total daily capacity of the York works up to 10¼ million cu.ft. This will cost £162,000 and will take about two years to complete.

Long-term proposals, which have still to be approved by the Ministry, envisaged adding a further 4 million cu.ft. a day to the capacity of the works by extending the present coal carbonization plant, thus bringing the total daily capacity up to 14¼ million cu.ft. It is estimated that this second and major part of the scheme will cost a further £650,000.

More than half of the additional output of gas provided for in the full scheme will go to industrial and commercial consumers, including biscuit manufacturers, confectioners, glass makers, and manufacturers of plastics. The remainder will be absorbed by existing and new domestic consumers. More than 5,000 new houses are to be built in York under present housing plans.

Coal Saving Target Exceeded

Members of the British Gas Council and other representatives of the Gas Industry attended the British Industries Fair at Castle Bromwich on May 15. After a tour of the Fair the visitors were entertained to luncheon under the Chairmanship of Sir Arthur Smout, a Vice-President of the Birmingham Chamber of Commerce.

Extending a cordial welcome to the visitors Sir Arthur described the Fair as a brilliant success and he felt it would have been a serious national blunder to have deferred it as some had suggested. "In my view," he said, "there is far too much 'waiting for a more propitious occasion' in these days." British industry had staged a rapid "come back" and had made a remarkable recovery since the end of the war. Of course there were difficulties, but he felt there were occasions when they were inclined to over-stress the obstacles they had to face. No other country involved in the war had since been able to stage an industrial fair of such magnitude. He had great confidence in the future of British industry provided non-industrial and political matters did not intervene and given full and effective co-operation between workers and management.

The Gas Industry, he said, has contributed so much to the development of British industry in the last 100 years that there was no need of any introduction from him. "I would like," he said, "to pay a personal tribute to the Gas Industry as a whole for the services rendered during the war. It fell to my lot to be responsible for the production of ammunition and what we should have done without the British Gas Industry I dread to think. Personally I think the Industry has a very great future before it and it will, I am confident, continue to play its part in the development of the industrial life of the nation."

Mr. J. R. W. Alexander, General Manager of the British Gas Council, in reply, said: Two years ago the Government decided that the British Industries Fair should be held this year, and, during the recent fuel crisis, they agreed, in conjunction with the Fair authorities, not to cancel the event, despite the acute difficulties with which the nation was faced. Those concerned in making these decisions are to be congratulated on their wisdom and courage, for the Fair in Birmingham and London has fully justified the action taken. Thanks are due also to those who have worked so hard to make the Fair possible. It is a striking demonstration of the virility of British industry and the variety and quality of British products. The Gas Industry is pleased to have been able again to participate in the Fair by a comprehensive and extensive demonstration of the industrial uses of gas, the industrial consumption of which has increased by 70% during the last ten years.

That British industry is able to design and produce the goods shown at the Fair is truly remarkable, having regard to the serious shortage of fuel which is the principal obstacle the nation has to overcome. The Government's target for the current year is the mining of 200 million tons of coal. But this will not meet requirements and disregards the fact that a continually increasing quantity of imported oil is being used in place of home produced coal.

By way of example, it should be mentioned that, at the request of the Government, the Gas Industry has continually increased its use of oil for gas making in order to save coal, despite the fact that the costs of production are appreciably higher and that for every ton of coal not carbonized, half a ton of coke is lost to the market. During the last three years the Gas Industry has raised its consumption of oil by 110% and this will be increased to 190% during the current year. This means that gas-works will save 6¼ million tons of coal this year by using instead no less than 216 million gal. of oil.

In addition to this the Government requested the Gas Industry, during the fuel crisis, to reduce the amount of coal carbonized by 10% during the ten weeks ended last week. The response was such that a reduction of 12% was effected, representing a saving of 625,000 tons of coal.

While, as a matter of expediency, the substitution of oil for coal for gas making materially decreases the Gas Industry's demand for coal, it must not be overlooked that the fuel economy of the country will not be restored until full use is made of the nation's coal resources.

A similar position is to be seen in many other industries. Imported oil, which needs shipping space, is being increasingly substituted for home produced coal, upon which the prosperity of the United Kingdom has been built and is still dependent. In considering, therefore, the amount of coal which should be mined, regard must be paid, not only to the immediate needs based upon the continued use of substituted fuels, but to the real coal requirements of the country both for internal use and export. If this consideration were associated with the established fact that true coal conservation can only be secured by the carbonization or gasification of all suitable coal, then the re-establishment of the industrial prosperity of the nation would be assured.

[Concerning the 12% reduction (2% above the target) in the amount of coal carbonized during the last ten weeks, Mr. Alexander informs us that the Minister of Fuel and Power on Friday last conveyed to the British Gas Council his appreciation of the hard work put in by gas undertakings in achieving this very valuable result.]

A "General" Pre-View

About 150 members of the British Gas Council (North Western District) visited the Audenshaw (near Manchester) works of General Gas Appliances, on April 30. They were welcomed by Mr. H. C. Wilson Bennetts, Chairman and Managing Director, and a member of the Executive Board of Allied Ironfounders, the parent body, and Mr. H. H. Wightman, Director and Secretary. They were later entertained to dinner at the Grand Hotel, Manchester.

At the Audenshaw works the visitors had a preview of articles which will be shown at exhibitions to be held throughout the country. The plant is mechanized throughout and laid out to produce at the rate of 1,250 gas cookers, 500 hearth type fires and 1,000 portable gas fires per week. The programme has not yet been completed owing to the difficulty of obtaining labour and materials, but in spite of this production has reached two-thirds of the figures quoted.

Since war contracts were revoked the whole of the works, with the exception of the compressor house, has been reconstructed for the manufacture of post-war appliances. During the war the plant was entirely devoted to the manufacture of bombs, &c.

Sales Discussion

Mr. G. C. Holliday, B.A., Manager of the Gas Light Centre, Watson House, recently addressed a large gathering of the Wandsworth and District Gas Company's Sales Discussion Group on the subject of "Gas and its Contribution to the Post-war Housing Problem." This proved to be of great interest and evoked a wide discussion.

On Mar. 18, three Directors of George Wilson Gas Meters, Ltd., namely, Mr. W. D. Wilson, B.E.M., Managing Director, Mr. D. C. E. Poole, and Mr. W. A. Dobson, gave an address dealing with gas meters entitled "Random Comments." Considerable display of meters and meter components was arranged, among which were American and Continental types. The large audience was particularly interested and many questions were asked.

Mr. Arthur Forshaw, Chief Chemist of R. and A. Main, Ltd., gave an Address entitled "Progress—Wise and Otherwise," at a meeting of the Group at the Tooting showroom on April 22. The Chair was taken by Mr. F. A. Cheeseman, Sales Manager of the Company, and a good discussion took place, reference being made to developments in the use of pressed-steel for hotplate burners, the use of cover plates on gas cookers, and the present trend to sacrifice effectiveness and efficiency for appearance in gas equipment. A vote of thanks to Mr. Forshaw was proposed by Mr. W. T. Carter, Manager of the Wimbledon showroom. The Chairman mentioned that this was the last meeting of the Group this season, but that a good programme was in the course of preparation for the new series, which would commence in October. The Wandsworth Company, he said, was glad to welcome the regular attendance of members of the East Surrey Gas Company.

Employees' Benefit under the Newport (Mon.) Gas Company's scheme for sharing the benefits between consumers, employees, and shareholders was distributed at a dinner at which Mr. R. Wilson Bartlett, J.P., Deputy Chairman of the Company, presided. Describing the scheme, Mr. R. S. Snelling, General Manager and Secretary, said the distribution was a reward for efficiency and it was hoped that the benefits would continue in future. Speakers at the dinner, in addition to the Chairman, were Mr. J. F. Rust, Engineer, Mr. C. O. Lloyd, Director, Mr. W. E. Crowley and Mr. G. Willey, who responded for the employees, and Mr. D. M. Hughes, Managing Director of British Benzole and Coal Distillation, Ltd. Special tribute was paid to the efforts the employees had made to maintain gas supplies during the past winter.

Glimpses Beyond the Gloom*

By Dr. E. V. EVANS, O.B.E.

WHEN I last had the privilege of meeting your Association it was in the middle of the war years. We then had grim experiences behind us and we knew that there were more to come. But there was a fighting spirit abroad in the land, a determination to win victory over our enemies and to restore peace. With that peace we knew it would be our duty to rebuild and re-organize our industry. In fact, even at that time—four years ago—we were looking ahead to our peace-time programme; to the things we should want to do when the fighting ceased.

The enemies we were then fighting have been beaten but we find ourselves now struggling with a less identifiable enemy in a less tangible battle. To-day, whichever way we turn, the outlook is gloomy: the morning papers, the radio news, the uphill work of the United Nations Organization, the scramble for food and for the simple comforts of life. I am going to analyze some of the difficulties we of the Gas Industry have to meet, not with the object of producing further gloom, but in order that we shall not forget the standards of service to the public we were once able to give. Before I remind you of some of the problems that confront us in the restoration and development of our Industry, I hope you will be in entire agreement with my view that whatever may be the new make-up of our Industry, whether it be nationalized or not, it is you, and you only, with years of experience in the technical and commercial conduct of gas undertakings who can restore and develop our Industry. However far we may have fallen from the standards we once set ourselves, however much we may be frustrated by licences, priorities, allocations, and many other annoyances, and above all by the threat of nationalization, it would be a major catastrophe if we lost faith in ourselves or in the Industry we serve.

Ingenuity in Difficulty

During the past years you and your colleagues in the Industry have displayed great ingenuity in dealing with difficult circumstances. With coal in dwindling supply you have at the behest of His Majesty's Government used oil instead, and, economic madness though this substitution undoubtedly is, you have kept the gas supply going. Demands for gas have exceeded the quantities which could have been made even if our plant were in first-class repair and supplied with coal of the quality which we expected to receive in the 1930's. Many consumers' appliances require renewal and, although the public is prepared to make such renewals, the appliances are not available. Moreover, we cannot obtain spare parts to make usuable the appliances that are wearing out. The manufacturers of appliances are often at their wits' ends to obtain material and then, having obtained a quota, to maintain standards of construction worthy of their reputation.

There is no standard which the practising gas engineer rates higher than continuity of supply. To let the supply of gas fail is by all the traditions of the Industry the one unthinkable failure. During the height of enemy attacks local failures did sometimes occur, but in the citations of the Honours Lists we read of the courage of men determined that that interruption should be of the shortest possible duration. Yet, with the enemy beaten and with freedom from aerial attack, many undertakings this winter have had to reduce pressure in their mains to such an extent that some localities have been brought very close indeed to a failure of supply.

Unorthodox methods of gas manufacture, using abnormal quantities of producer gas, water gas, or oil, which have been introduced to conserve existing stocks of coal, have made our pre-war striving after uniform combustion characteristics seem far away. The present-day composition and variations in composition of gas in some parts of the country fall very far short of our former standards. Yet so great is the desire for the comforts that gas can give and so small is the chance of obtaining any alternative that complaints are reasonably few. Herein lies the great danger that we may come to believe that if we can "get away with it" under present conditions the higher standards for which we once aimed are unnecessary. The tolerance of gas appliances to change in gas quality may be a little greater than laboratory observations led us to believe, but I know they cannot be expected to burn efficiently using all the changing types of gas with which we have to supply them. We should be wise to consider that many consumers are putting up with inadequate performance believing it to be the best that they can expect at the moment. In that, of course, they may be right, but we must beware lest they come to think of this inadequate performance as the best that they can ever expect from gas and gas appliances.

Coal Conservation—The Only Way

To-day we are having to give consideration as to how stocks of coal for next winter can be built up. There is really only one way of conserving coal used for domestic purposes and that is by prohibiting its use in wasteful appliances, and notably in the open fire of ancient design. If the public would restrict the use of fuel to such cooking and water and space heating operations as are essential to a reasonable degree of comfort, and would use gas as the fuel for these operations, then the highest degree of coal conservation would be achieved. It would happen, of course, that if the country suddenly adopted this fuel conservation policy we should find it impossible to meet the sudden additional load in gas and gas-burning appliances. This embarrassment should not be exaggerated; a change of this nature will not occur suddenly although it could take place sufficiently fast to keep us extremely busy. In this matter of short term measures for the conservation of coal stocks I think we have been successful in our advice to the authorities that a percentage reduction in pressure on the distribution mains is not an effective way or even an economical way of controlling output. The unequal effect of a similar reduction on different distribution systems, or even on different parts of one distribution system, and the different effects on different types of appliances, are the cause of real hardship to many consumers. Restricting the hours of usage also would yield no saving of fuel, for the essential processes of cooking and water-heating would then be carried out at other times of the day and probably in a less economical manner than they would have been had they been carried out as the normal procedure of the household. An appeal to the public to use gas sparingly and even to suffer some discomfort would appear to be the wisest course. And this course has been adopted by His Majesty's Government.

Possible Deferred Trouble

You must allow me to continue the picture of gloom in order that it may increase our determination to win through. There is the matter of the possible deferred trouble that we may be building up for ourselves. Oxygen, ammonia, and hydrogen cyanide are all potential corrosive agencies in town gas. If we allow their concentrations to increase above a minimum, we can be sure that renewals on the district of supply will one day demand payment for our present failings. It is, of course, impossible to undertake the installation of plant for the removal of organic sulphur compounds when gas making plant itself requires so much attention, and we must, I suppose, for the time being allow the oxides of sulphur to play havoc with gas appliances.

We should ask ourselves also how much gum is now going forward into distributive systems, either vapour-phase gum from the incomplete removal of nitric oxide, or liquid-phase gum from polymerizable unsaturated hydrocarbons due to the excessive use of oil. As soon as possible these matters must be again brought under control. Before we can return to a satisfactory standard of service to our consumers we have to make up vast arrears of appliance supplies, of maintenance and appliance replacement.

* Address to the Annual Meeting of the North of England Gas Managers' Association at Newcastle, May 9.

Our production plant is overworked and has been overworked too long. It is dealing with inferior coal which not only reduces its capacity but adds to the wear and tear on producer linings. We have been unable to maintain our standards of coke quality and this is most disappointing when we are intent upon its being the pre-eminent smokeless solid fuel.

It is a tribute to the technicians of the Gas Industry that in such circumstances the output of plant and yields of products have been so well maintained, though this has often been at excessive cost in labour and in material for patching where replacement would have been a wiser procedure. With all this has come a decreasing degree of reliability in tired plant.

Electricity Breakdown

Of course, we are not alone in our difficulties. Far as we may have gone in departing from our pre-war standards and aims, we have avoided a collapse so catastrophic as that which has overtaken the electricity supply industry in recent times. That breakdown was, in the main, not caused by circumstances beyond the control of the electricity industry but as a direct result of pursuing a policy of inappropriate development which could, sooner or later, have only this result. Apart from the fact that, as I have shown on other occasions, the use of electricity for heating involves a waste of the national coal resources, the domestic cooking and heating load is an extremely difficult and costly load for a form of energy which cannot be stored but is available only at the instant of generation. The domestic cooking and heating loads could only be obtained in competition with gas by selling electricity below its true cost of supply. In justification of this artificial pricing it has been argued that the domestic load is off-peak the industrial load. The hours of load shedding and the hours of restriction should surely have exploded that argument for good. The irony of the situation lay in the fact that the users of electricity for essential purposes, such as lighting, power, and transport, who had paid the full cost of supply, and indeed contributed to the support of the domestic business, were from time to time deprived entirely of their supply. This national calamity will have an indirect beneficial effect if the bitter experience can compel a more rational development of electricity supply as a partner in the whole business of the public fuel supply, taking its appropriate place with other forms of fuel and energy and subject to economic discipline in its development.

I suppose that, if, during the war years, I had dared to recount our present misfortunes with my present frankness, I should have been criticised severely for spreading alarm and despondency.

I am hoping that to-day it is not unwise to present this grim picture in all its sombre tints because it helps us to understand and to brace ourselves for the long struggle back to conditions of reliability, economic and technical efficiency and the rendering of the highest standards of consumer service.

The substance and purpose of our work is to provide a completely reliable automatic efficient and uniform fuel service. The attractive trimmings in the forms of new styles of appliances, good publicity, public relations and so forth, are all necessary and essential, but they are worth nothing if the technical service and technical achievement are lacking.

No Place for Politics

It will require years of strenuous effort to restore our standards to their former level and then proceed to raise them as we were hoping to do when war interrupted our progress. There may be some who wonder whether the effort is worth making under the shadow of so great an impending change as the possible nationalization of our Industry. Here I may say that whether the present Government passes a Bill to transfer the Gas Industry to national ownership or not, some form of greater integration must certainly come about. The report of the British Gas Federation saw its inevitability; the Heyworth Committee recommended to a coalition Government a particular form of public ownership and control. The present Government appears to have more far reaching ideas on the subject and to-day the ownership of the British Gas Industry seems to be a political matter. There is no place for politics in our Industry.

Perhaps I should make my own position clear on this matter of nationalization of our industry. I see much possible injustice and no advantage at all in the nationalization of our Industry. If nationalization is imposed upon us the progress of the Industry can continue only if its affairs are conducted by men of ability trained in the Industry itself.

We are technical and commercial people who understand the complexities of our business, who have faced and have overcome the difficulties of war, and the perhaps greater difficulties of this post-war period, who know our present deficiencies and, more important still, know how to apply the remedies necessary to carry the Industry through the difficult years ahead.

I see no reason why our Industry should set limits in the way of technical achievement, but if our skilled and experienced staffs allow control of their Industry to pass from their hands into the hands of administrators in Government offices who do not possess that skill and experience, the Industry must falter and die. The staffs of these offices are excellent and capable people for discharging the responsibilities of administrative government, for seeing that edicts of Parliament or of His Majesty's Ministers are carried into effect, but they cannot possibly replace the man trained and skilled in the technique of Industry for the conduct of creative constructive work. In my contact with responsible Civil Servants I have reason to believe that they are substantially in agreement with this viewpoint.

The technical man in Industry must see that he retains control, that he retains also a vision of to-morrow and to-morrow's developments, and these qualities will make the Gas Industry capable of contributing more than ever before to the prosperity of the country and to the comfort and well being of its people.

Plea for Cleaner Coal

The National Union of Manufacturers has made representations to the National Coal Board regarding the poor quality of the coal frequently supplied to industry and asking for more efficient cleaning at the pit-head. The National Union also asked what future prices of coal are to be in order that production plans could be made with greater accuracy.

In his reply, Lord Hyndley wrote : "We realize fully the need for a progressive improvement in the quality of the coals marketed to-day and we are already taking preliminary steps to secure that end. You will understand, of course, that this matter must inevitably take a considerable time, involving as it will some reconditioning of existing preparation plants and the erection of new ones. Nevertheless, we are convinced that there is much that can be done in the meantime in securing some improvement in quality and we are energetically working to that end.

"As regards price, this is equally a problem that cannot be resolved in a short time. But we are already engaged in the preparation of a new price structure for the industry with which we shall combine a more logical system of grading and sizing with particular reference to the report on that subject by the Coal Grading Committee of the British Colliery Owners' Research Association, which you have probably seen.

"You can rest assured, therefore, that on both the points you raise we are working actively. I would add that on the question of a price structure, before we reach final decisions, we shall take an opportunity of inviting organized consumers of coal, as well as organized distributors, to talk with us."

North of England Association

The Annual General Meeting of the North of England Gas Managers' Association was held at the County Hotel, Newcastle, on May 9, when Dr. E. V. Evans, Past Chairman of the Gas Research Board, gave an Address (see page 387).

The President, Mr. C. C. Walmsley, presided at the meeting, and at the luncheon which preceded it, which was attended among other guests, by Mr. H. O. R. Hindley, Chairman of the Northern Division of the National Coal Board; Mr. F. Johnstone, Senior Regional Officer, Ministry of Fuel and Power, and Mr. D. Morton, Regional Gas Officer, Ministry of Fuel and Power.

Reports were submitted on the proceedings of the Institution of Gas Engineers and of the District Education Committee and it was decided that a donation of £21 be contributed to the Benevolent Fund of the Institution of Gas Engineers.

The election of officers for the ensuing year resulted as follows: President, J. G. Aitken (Carlisle); Vice-President, F. L. Scaife (Stockton); Committee, B. Richardson (Newcastle), F. Wilson (Darlington), and J. F. Jackson (Newcastle); District Education Committee, R. H. Duxbury (South Bank), J. M. A. Mitchell (Newcastle), W. Sutcliffe (Blyth), and F. Wilson (Darlington), in place of E. Crowther (Newcastle) who did not seek re-election.

Mr. A. S. Middleton (Durham) was re-elected Hon. Secretary and Treasurer and thanked for his services during the past year and Mr. J. R. Gledson (Blyth) was elected Auditor.

Mr. E. Crowther, moving a vote of thanks to Dr. Evans, said the general public did not underrate the necessity for the Gas Industry. It had stood between the public and very great hardship. He hoped the public had been impressed with the manner in which the Industry had undertaken tasks which a few years ago had been beyond contemplation. What was troubling industry and the country to-day was lack of that unity of purpose which had existed during the war. If they could recover this unity of purpose they would get along better.

The vote of thanks was seconded by Mr. H. P. Allison.

Gas Research Board: A Review of Eighteen Months' Work

Instead of meeting annually in June and dealing with a report already a year out of date the Gas Research Board will hold, as it did last month, a full day meeting in April and receive a report up to the preceding December. To bridge the gap, therefore, in addition to the 7th Report already discussed at the Autumn Research Meeting of the Institution of Gas Engineers last November, an 8th Report covering the latter half of 1946 was presented at the annual meeting on April 16. The two Reports are already in the hands of the Industry, and we give below a report of the discussion on their adoption.

THE Chairman (Dr. E. V. Evans) formally moved the adoption of the 7th Annual Report, covering the 12 months ended June 30, 1946, and the 8th Annual Report, covering the interim period from July 1 to Dec. 31, 1946.

Dr. **H. Hollings**: In seconding the resolution I should like to refer to that paragraph in the latest report which refers to the review of the Board's programme of practical investigations. Behind this brief reference in the Report there lies a great deal of thought and hard work on the part of those members of the Panel whose names are mentioned. In approaching our task we recognized that we are all looking forward to a period of expansion, and we sought to define for ourselves what should be the guiding principle on which the programme of the Board should be expanded. There is, of course, nothing rigid about this. It will have to be modified from time to time to suit the changing conditions of the Industry, but we felt that we should survey the whole field of technical requirements of the Industry at the present time and after having considered what needs are being met already, we asked ourselves what research work could be carried out more efficiently by this national organization representative of both sides of the Industry and having the support of the D.S.I.R., than by anyone else.

It has been agreed that we should modify the existing programme to include such a proportion of short-term projects of a practical nature as is necessary to command the interest of the practical people in the Industry. We believe that this will be of considerable value in educating our own staff as to the problems on which research should be undertaken and at the same time educating the Industry to a better appreciation of the service which science can render it.

More Severely Practical

It follows that for a time the programme will be more severely practical than heretofore. We do not, however, suggest that the Board should neglect the longer-term projects. Indeed, we recognize that in any industrial research programme a certain proportion of highly academic study is desirable if only to maintain the scientific level of the more practical work. We believe, further, that some of the short-term projects now agreed will, in time, lead quite naturally to the evolution of the new longer-term projects.

In order to give you a general picture of our future intentions, I would like to refer to three matters.

We have decided to give a higher priority to a survey of the size distribution of coke derived from various types of coke handling plant and from types of coke cutting machinery operated under different conditions. This survey will lead on to a study of the size distribution of coke resulting from different coals and from different carbonizing plants. We are advised that this is a matter which is regarded as of great urgency by the London and Counties Coke Association and we are very happy to know that we shall have the benefit of their advice in carrying out the work. I am convinced that nothing but good can come from bringing the staff of the Board into close contact with the practical problems of coke production in this way and that in due course it will be possible to define more clearly what should be the longer-term objectives of research in this field.

Turning to another question affecting the gas production side of the Industry, we have been impressed by the circumstance that whereas the records of the Joint Research Committee over a long period of years show that outstanding pioneer work has been done in the whole field of gas production—I refer to the early work on continuous vertical retorts, the work on water gas plants, and the later work on complete gasification—the field of gas purification has been neglected except for the somewhat specialized work dealing with ammoniacal liquor. We have decided to undertake a new survey of the technique of operation of the conventional iron oxide process for the removal of hydrogen sulphide, and the detailed programme will also include work on the solvent extraction of spent oxide. With the rising cost of labour associated with the handling of oxide, it appears desirable that we should know much more about such factors as the caking of oxide and, having regard to the present market position of spent oxide, we should know more about alternative methods of disposal. This again is a new line of work which will bring the staff into closer touch with works requirements and which will, I believe, quickly open out a wider field of long-term projects.

I think I should add at this stage that after having considered what has been done and what is being done in various parts of the world in connexion with liquid purification processes, and bearing in mind our limited resources in scientific manpower, we have, rightly or wrongly, decided not to undertake research in the field of liquid purification at the present time, but I assure you that this important subject will be reconsidered by the Council from time to time.

Gas Utilization

The third point to which I should like to refer is that the Council is impressed with the need for more work in the field of gas utilization, but I should like to point out that it is far easier to make a vague statement of that kind than it is to say precisely what practical work we should undertake. We have this matter, however, under frequent review and it is possible—and indeed it is to be hoped—that the symposium on gaseous combustion which is arranged for this afternoon may help the Council to crystallize what are the most urgent research problems.

Now, of course, there are many other separate items on the research programme and there are other new items which are under consideration by the Council. All these are going to be considered sympathetically at a special meeting of the Council called for to-morrow (April 17), but I hope I have said enough to indicate to members of the Board the direction in which our work is now developing.

Dr. **J. G. King** (Director, Gas Research Board): Only six months have elapsed since the presentation of the 7th Annual Report, for the reason given in the first paragraph of the Report of Council in the present Report. When presenting the 7th Report, I made a special point of inviting comment upon the scope of our research programme. Dr. Hollings has already explained what steps have been taken to add new sections to the programme, but if there are fresh thoughts in the minds of to-day's audience, I would like to hear them expressed in the discussion.

Speaking as the Director, and remembering the severe limitations which are imposed on the progress of research by the lack of what may be termed "bench space," I would say that the highlight of this 8th Report is the announcement that we have acquired a headquarters site. Even if we are not permitted soon to build new laboratories to our exact liking, we now have something on which we can expend thought and energy in preparing for the future. The building now on the site is not suitable for our purpose, but we can make use of it until permits for new building are obtainable. To those of you who come to inspect in due course I would say, look at the site with the constructive eye which sees beyond the present to an organized establishment worthy of the British Gas Industry. In my opinion it is of the greatest importance to the Board that we should spare no effort to establish and expand this headquarters quickly. In my experience, too many separate groups lead to duplication of work and high overhead expenditure, seriously hinder the interchange of staff, and impose undue wear and tear on the Director.

New Sections

The 8th Report is divided substantially into the same Sections as before, but indications of change in the direction of the research effort are seen in the appearance of new sections on coke research, gas meter diaphragms, and combustion research.

Dr. Dent has continued his researches upon the reactions between coal and hydrogen under pressure and has advanced considerably our understanding of what is taking place. The translation of the sphere of these reactions, and those of carbon and oxygen, to a production scale, and the exact form of the necessary prototype plant is now exercizing the minds of the Gas Production Committee. It is not proving easy to reach a decision as to the right course to take. In the meantime, new data are being collected. It would seem from this recent work that the important factor in the control of the hydrogen/carbon reactions is the rate of dissipation of heat from the reaction zone, and the exploration of means of control should lead to ideas for process development. It may be that the answer lies in a fluid system involving the gasification of powdered coal in several stages, with adequate heat exchange to achieve control of reaction temperature. This is being explored by a study of the technique used with fluid-flow systems in the refining of petroleum and by practical experiment with models.

The inter-scale experiments on methane-synthesis are in full swing and are being backed up by the studies of the kinetics of the reactions, of reaction equilibria and of catalyst structure at different stages of use. It is gratifying to find that the methods of

control of reaction conditions devised in the laboratory have so far proved entirely satisfactory on this increased scale. When the present tests have run their course, critical examination of the results will decide whether, and in what form, industrial application is justified. If justified, a further intermediate step in increase of scale would not be necessary.

To facilitate Dr. Dent's work at Poole, we have erected a temporary laboratory, which is now in use. We are also preparing to erect a small water gas plant on which to examine the effect of preheating the blast and, later, of enrichment by methane synthesis. In all our work at Bournemouth, and particularly in this new work, I cannot speak too highly of the generous help given by the Bournemouth Gas and Water Company, through Mr. Moon and Mr. Haynes and their staff: Mr. Wilkinson was particularly helpful in the difficult job of erecting the new laboratory.

Sulphur Removal

The research work on the removal of organic sulphur compounds from coal gas is being reduced in volume for reasons already given. There is still no adequate method, however, for dealing with thiophene where benzole recovery is not practised and, at some stage, we should probably return to this problem. It is proposed to direct our energies now, in the sulphur question, towards making a detailed study of the technique (or art) of operation of iron oxide boxes for the removal of hydrogen sulphide from oxide gas. A careful study of the variation of existing methods over the country should provide information of immediate value to the gas engineer and may lead to new work on oxide treatment and sulphur recovery. As a longer-term project, "fluid" systems will be investigated, as Mr. Haynes advised in the discussion of the 7th Report last autumn.

In the section dealing with the utilization of gas, we have made rather less progress than before because this section has suffered relatively severely by loss of staff. Mr. Wood's two surveys are all but completed and we can look forward to receiving considered results of these surveys at the Autumn Research meeting this year, together with a statement of the conclusions which emerge. Some of these should have immediate value, if not in practice, certainly in the understanding of the variables which are present. Others will point to new programmes of research. It is proposed to extend generally the field of research on combustion. Some work is already planned or in progress and, no doubt, valuable suggestions will emerge from the discussions this afternoon. In my opinion, our programme should include combustion research, heat transfer and corrosion, all as related problems, and work on each branch should advance together.

Corrosion of Water Heaters

The Paper on the corrosion of water heaters, presented last autumn, had a most gratifying reception if only in the fact that some of the comments were distinctly critical. The work has been continued with pure gases and with gases of different sulphur contents to complete the corrosion curve, and the programme will then be broken down to its constituent problems. I should repeat that the purpose of this work is not to conduct tests on the performance of apparatus but to investigate factors of combustion and heat transfer in relation to corrosion and its prevention.

The study of methods of radiation from fires has disclosed more possibilities of error than was expected and we still have some factors to resolve, for example, the selective absorption properties of different blacks. The influence upon measurements of radiation of absorption by atmospheric moisture and carbon dioxide has been evaluated, since attention was drawn to the matter by Prof. Rideal in the discussion of the 7th Report. Mr. Hasledon has continued his work in Prof. Sir Alfred Egerton's team on the separation of gases at a low temperature. One phase of the work may have an important effect in increasing the thermodynamic efficiency of gas separation by minimizing the rate of growth of crystals on the walls of heat exchangers. The ill effects of oil vapour have already been demonstrated; in this Report, the effects of physical factors such as rates of gas flow and temperature difference between gas stream and cold surface have been examined. Increase of the velocity of the gas stream beyond a certain value increases the rate of deposition. It is shown that a temperature difference of 4.6° gives, after a time, a period free from deposition. Both observations have importance in the design of gas separation plant. It may be repeated that the interest of the Board in this work lies in the possible use of oxygen-gasification processes and in the separation of ethylene or methane from coal gas.

Collaborative Work

Two pieces of collaborative work are worthy of special mention. The first is the search for a substitute for leather for gas meter diaphragms. In this search there are assisting the Board, the Rubber Research Association, the laboratories of the Dyestuffs Group of I.C.I., Ltd., the meter shops of a gas company, an important appliance maker, and a manufacturer of diaphragm leathers. The search for plastic or plastic-impregated materials is continuing and it will not be long before materials are put on field test. The second collaborative research is the investigation of the causes of failure in welded gas mains. Although the part played by the Board's staff is small, the conduct of the investigation is an excellent example of true collaboration on all the different aspects of the problem, from academic studies of the effect of soluble salts on metals in universities, to the metallurgy of the weld structure in the steel industry, and the influence of practical conditions on both. Such collaboration must be the quickest route to the answer to any problem that has industrial repercussions.

As formerly, the Board are indebted to the British Refractories Research Association and its Director, Mr. A. T. Green, for the conduct of certain programmes of work concerned with refractories for the Gas Industry. May I direct your attention to that part of the work which concerns the behaviour of refractories during use on carbonization plants and to the fact that it has been considered wise to increase the volume of this part of the work.

This is a brief review of the programmes of research of the Board and of the plan of campaign. I should now be very glad to have your observations upon the subject matter of the Report. Before sitting down, I should like to say a word about staff difficulties. I have felt that the bottle-neck in our progress is the lack of what I have called "bench space," but the worst bottle-neck is the difficulty of obtaining adequate scientific staff. The past year has been a very difficult one from the academic point of view; because of the extension of the period of academic training we have had very few recruits during the current year, but I think that situation will improve during the following years. It is the fact, however, that we have lost four members of our staff during the period under review and have only acquired ten new ones. We have many more programmes of work to do and some of the present programmes are inadequately staffed. Therefore, we must do all we can to acquire new staff.

The Chairman: In calling upon Dr. Roberts to speak, I should like to take this opportunity of saying how gratified we are that he now becomes Professor Roberts and now occupies the Livesay Chair at Leeds. I think this is a very suitable occasion to let him see that we are appreciative of this and that he has our complete confidence as the Professor.

Livesey Professor's Debut

Professor **A. L. Roberts**: May I say first of all how I appreciate the confidence of the Industry in having appointed me Livesey Professor. It will be a big job to maintain the high traditions of previous Professors and I shall do all I possibly can to uphold those traditions and to ensure the strongest possible collaboration between my University Department and the Industry through the Joint Research Committee, and always to maintain contact between the Industry and the Research Board.

The Report covers the whole field of research programmes which are now under active investigation by the Board, although since the publication of the 7th Report some eight months ago there are a number of investigations within the framework of gas production and gas utilization which have been put in hand in the meantime. There is a number of researches in which we at Leeds are particularly interested and which are being carried out by means of the collaboration, to which I have referred, between the Board and the University under the ægis of the Joint Research Committee. Therefore, for my contribution, I should like to refer to certain aspects of this work which are necessarily only referred to briefly in the Report.

On the gas production side, which Dr. Hollings has referred to, attention is now being largely concentrated on the generation of the catalyst. I think this is the right sort of work that a Department such as ours should be doing collaboratively with the Industry. Progress in the development of better catalysts has been successful, and looking down the years I think that progress has really been substantial. The work has had necessarily to be of an empirical character, but the day-to-day demands of the development of gasification work have called for the production as soon as possible of an adequate catalyst without making it possible to examine just precisely how these catalysts have been developed. I think, however, that all concerned are agreed that a stage has now been reached where a more fundamental study and explanation is possible of what has been achieved with the catalysts now developed. More background work is contemplated using modern methods in which, of course, is included X-ray spectography together with certain analytical methods. I feel that work of that character is eminently suitable for the Joint Research Committee and in view of the past development, I think an extension of this work along more fundamental lines is bound to give very valuable information, taken hand-in-hand with accumulated experience. For these reasons, I think that a continuation of this work along the lines foreshadowed in the Report is greatly in the interest of the Industry and must eventually contribute very materially to our knowledge of the catalytic process.

Radiant Heating

On the gas utilization side, I should like to refer to the programme of work on radiant heating. There are several problems of immediate practical interest still under investigation in the

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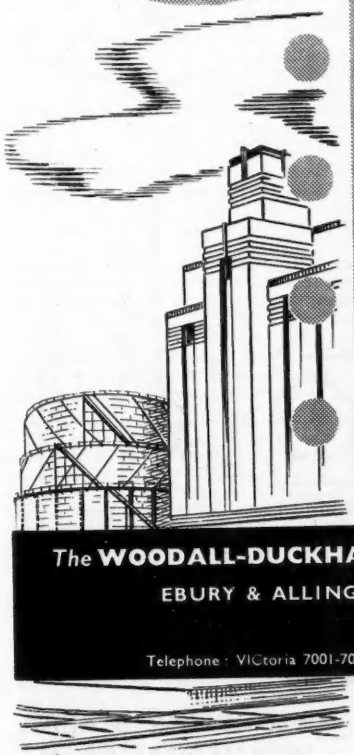

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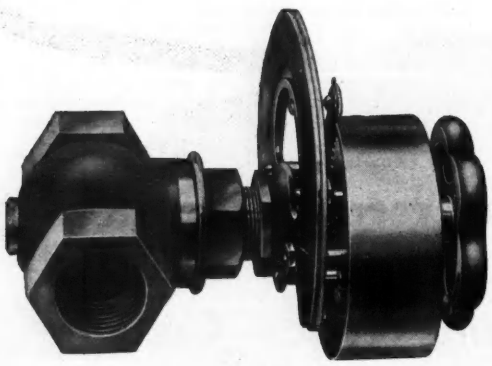

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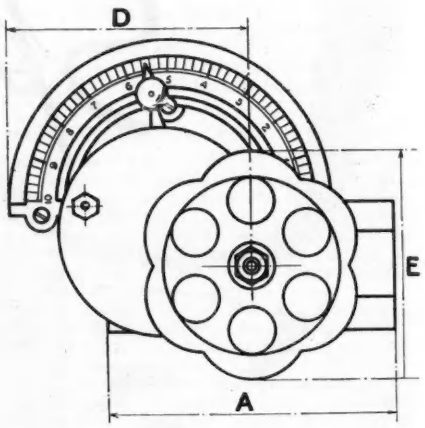

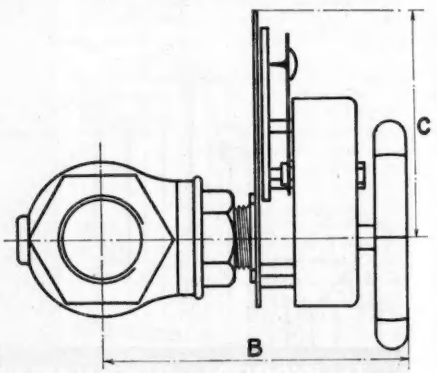

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radiant heating field, and once again we have extended our collaboration to the Director in regard to certain practical problems which we believe are capable of solution or, at any rate, are capable of being better understood by means of infra-red spectroscopy. The Director has already referred to black coatings for radiometers and we have collaborated with him in seeing how far the black coating can be improved. The infra-red equipment, which we have considerably improved during the past year or two, has never been very effectively used for examining emission spectra from gas fires, and that is another instance of immediate collaboration.

But infra-red technique is now being applied mainly towards the possibility of using it for the analysis of light gases. This question of using physical methods rather than chemical methods for gas analysis and the analysis also of liquid products, is very much to the fore at the moment. The oil industry, for example, is making very great use of infra-red spectroscopy for the analysis of light gases, such as CO or CO_2, or even simple mixtures. Apparatus is being developed and will be available shortly—judging from the prototypes which were shown at the Physical Society's recent exhibition. This apparatus attracted a great deal of attention, but the particular problems we have to investigate in this field are more complex. However, although it might sound a little optimistic to say so, I think it is possible that over a long period these methods may throw considerable light on the problems which have to be investigated. Without question, the analysis by infra-red methods of complicated mixtures of gases will take a good deal of unravelling, but I feel that the potential value of the application of this method is very high. There seems no doubt that once worked out these methods of analysis should be valuable in many researches now contemplated by the Board.

Aims of Investigation

Mr. **P. G. G. Moon** (Bournemouth): I have seen most of the work at Poole and it is on this subject I would prefer to speak. The whole of the work has been so clearly set out in the two reports and so accurately described that there is really very little I can say that will add usefully to the information contained in the reports, but as one reads these reports one is rather tempted to ask the question, "Whither away?" In other words, what are we aiming for in this long-term investigation of the hydrogenation of coal and the synthesis of methane? The Reports suggest two broad lines: (1) Complete gasification, and (2) hydrogenation with the use of the residual coke as a smokeless fuel. From my observations, in order to get a proper hydrogenation of coal you have to have your material in such a very fine form—from ¼ in. to ¼ in.—that personally I cannot see that that residual will be in a form that can be used as a substitute for smokeless fuel. Therefore, my own feeling is that in the hydrogenation of coal we are really dealing with the long-term problem of gasification. I do not know how far our Director and others concerned agree with that, but I feel that that is very definitely the line along which that particular investigation is tending.

I am sure it would be very desirable if we could test coal in a Lurgi regenerator—we did have hopes of getting one over here—so that, on a large scale, we could find out how English coals behave in the Lurgi full-size plant, but apparently that does not seem possible. It may be possible, I hope, to get the use of a Lurgi plant on the Continent and possibly send over some of our coals and observe the reaction. I should think that Dr. Dent is the right man to go over and do that and get some up-to-date and useful information on a working scale. Of course, it may be possible that when our Director gets back from America—which I gather he is visiting in the near future to study the fluidized catalyst process and other matters—we may get some valuable information, but again it seems to me that anything we get in that direction is along the complete gasification line.

The other matter I should like to speak about is the success of the methane synthesis plant. As you have heard, it now appears to have been working for over 800 hours at the reasonably decent rate of about 1,000 cu.ft. per hour, and as far as one can see, there is no substantial change in the catalyst, so that the research workers are doing useful work. They are getting gases up to a calorific value of 680 B.Th.U., and there is therefore a means there of adding calorific value, and it looks as if they are out to get total gasification.

Finally, I should like to refer to the short-term policy, already mentioned by Dr. Hollings, of the various problems to be tackled by the Research Board. Several were mentioned at the last meeting of the Institution of Gas Engineers and we appreciate that they are there and that they need investigation. They are what I term short-term policy as opposed to long-term policy problems with, ultimately, complete gasification, but I take it that neither the people who spoke about these things at the last meeting nor Dr. Hollings himself would sugest that we should scrap the long-term policy in favour of the short-term policy. In my view, both policies should be pursued to the best of our ability and with all the effort we can put into them.

The Role of the Staff

Mr. **A. G. Grant** (Chairman, Establishment Committee): At the front of the annual reports we find a list of the officers and Council of the Gas Research Board, and if we look at the back we find a list of the staff of the Board. If I may say so, I think that is the wrong way round. At all events, the Council and Director are assisted and advised in the matter of staff by the Establishment Committee—which really means Staff Committee—and perhaps as Chairman of that Committee I might speak on that aspect.

This meeting is concerned largely with research and its results. In industry there is the term "instruments of production," meaning the machine tools; but in research the "instruments of production" are almost entirely the brains and ability of the staff. You can see from successive Reports that at the end of the European war in 1945, in addition to the Director and an Assistant Director, we had five people whom I might call senior administrative staff capable of controlling group work, and 19 scientists in addition to less qualified people. In 1946—a year later—we had six plus 20 and we now have six plus 27. Thus our staff has not been growing in the grades which include the true research scientists, from young honours graduates upwards. Our total staff has grown from 47 to 66, which includes the Experimental Section, Office Staff, &c. In all, we now have 30 scientists and they have to be distributed over 20 active programme subjects, many of them having a number of side streams and subsidiary investigations attached. It is nearly two years since the European War ended and we have had only possibly one year of effective work. Mr. Moon has, in effect, just asked what we have accomplished. I think the question is not what we have accomplished but how we judge our accomplishments both now and in the future—and that is very important from the staff angle. If we call a meeting of shareholders of a company which has been formed two or three years previously, it would have been anticipated that those two or three years would produce nothing; perhaps an assembly line and a car or two coming off which would eventually be the standard product. But the shareholders are informed of the number of cars then to be produced and the profits that would be made. In the case of the Gas Research Board, however, there is no such yardstick. The Board does not make standard products and its job is not to produce new things. It seems to me that we should emphasize to our members that our object in the main is to produce a steady stream of sound work, of information and data on new vistas and new ideas to be applied, in the main, by the Gas Industry itself, both gas engineers and manufacturers of plant and apparatus.

The Quest for Knowledge

I say this because I think it is most important that our staff should not be discouraged and frustrated by any suggestion that they have to produce rabbits out of a hat in the shape of new inventions or ideas at frequent intervals. There is nothing more discouraging than that to a scientist. The work of our staff is that they should go solidly and imaginatively along producing information and data which will lead to development of new processes. I have in mind, in all this, the need for emphasizing to our members that the value of the Gas Research Board to them, and the only way in which our staff can feel really encouraged and rendered enthusiastic, is by feeling that the scientific staffs of our members are taking an active interest in the work that is being done in looking for complete answers, following the research, its finance and its results, and collaborating in its application to the Industry itself. The Gas Industry notably in the past has succeeded because of the imagination and brilliance of engineers and chemists all over the Industry. They are the people who have brought about new plant and processes and that, I think, must continue, but the people with these abilities in the Industry to-day have the Gas Research Board work upon which to build. Therefore, I should like to think that the Industry as a whole is interested in our work and shares the responsibility for it. In certain cases, such as complete gasification, for example, it may be that we shall have to go the whole way to produce a definite result, but in a great many cases that is not so and a knowledge of that will give life and interest and reality to the work of our staff rather than that they should feel a necessity to produce inventions and new ideas at frequent intervals.

Having said this, I must support the Director in his note of caution about the staff to-day. I think we have in hand the minimum number of research problems which we could possibly carry in the light of the many problems of the Industry. We could not avoid doing the things we are doing to-day, but we are understaffed for them. We think that our salary scales for a body of this sort are good and we are ready to apply them imaginatively to encourage and reward ability, but we are up against competition and a great shortage of scientists and we are also up against the problems which arise from the conditions of to-day. We have staff all over the country, many of them moving about. In some ways that is healthy, but with housing conditions as they are to-day that is not an entirely attractive prospect. However, I think we should emphasize to our members that our first

consideration regardless of quantity of work is to maintain the quality and calibre of our staff. We have set out faces firmly against taking secondhand people merely to increase numbers and keep a lot of work in hand. We are trying to plan our subjects as well as we can and keep them down to reasonable numbers. If we have too many subjects, the work might go too slowly and the staff would be frustrated. We must not expect brilliant inventions. We require rather, as I have said, sound work and sound thought and a continuing stream of investigation of a kind that will lead to new ideas.

Finally, it seesm to me that one argument in favour of the new headquarters, apart from the purely geographical and research ones, is that it will give us a home front around which we can build up the staff spirit. If any of our members go to Bournemouth, they will see there the atmosphere of good research; they will see no ambitious or showy plant, but a plant of a good type and a team of people who together in that atmosphere are bound to do good work, and I think that in the new headquarters we shall be able to develop that spirit still further. I think we shall be able not only to produce good work from our existing staff, but we shall attract men to us.

In these remarks I have wanted to emphasize that a large part of the success of our future work must be planned on our staff, not only on its basic calibre but on the encouragement which it has and the enthusiasm which it receives both from the work it is doing and the interest that the industry as a whole takes in it.

The Plant Designer

Mr. **T. C. Finlayson**: Although it is my privilege to be in close touch with the research work carried out by Dr. King and his staff, I would like to make my few remarks from the viewpoint of a plant designer. It seems to me that the work on the gasification of coal in hydrogen under pressure, and on the synthesis of methane, are two good examples of programmes which should be carried out by a Research Association. I say this for three reasons: (1) The programme will make a definite contribution to our knowledge on gas manufacture. (2) They are on such a scale and of such a complexity that they demand the application of a research team. (3) The practical outcome of the work is sufficiently uncertain as to make it not particularly attractive for prosecution by normal commercial organizations. These two research programmes have reached stage two in their progress—a stage which, to some, may appear rather slow and uncertain but which is most important in the development of new commercial processes.

Considering the process of high pressure gasification, stage 1 comprised the small scale laboratory work, in which the reactions were considered in two parts: (a) The reaction of oxygen and steam on coal, and (b) the reaction of hydrogen on coal.

Based on this information, the programme passed to stage 2, the semi-scale work, which must not be confused with a semi-scale plant or pilot plant. It was the stepping up of the scale of the reaction to see what new problems arose. It would have been most dangerous to have interpreted the laboratory scale work to full scale work without this intermediate stage.

At Bournemouth, the Gas Research Board staff have been investigating the complicated reaction of hydrogen on coal, in the semi-scale unit. Such questions as to whether the small scale reaction would take place on the larger scale, whether the yields of methane are similar, whether the results are reproducible, whether the hydrogen can be distributed through the charge, and so on, demanded investigation.

The fact that some difficulties have been experienced was to be expected, and I would like to remind the research staff who have been so ably conducting the work at Bournemouth, that the more difficulties they have experienced and overcome the greater the value of the semi-scale stage work.

Just as the reaction of hydrogen on coal under pressure had to be analyzed and considered in parts on the laboratory scale, so it has proved necessary to dissect the reaction in the semi-scale unit, in order to obtain an understanding of the various factors. It is from an understanding of these various factors that a commercial design will eventually be evolved. How this process of high pressure gasification will evolve, it is too early to say, but it may be worth remembering that having analyzed the reaction into its various components, the ultimate process may be a combination of various reactions. Thus, although the Director suggests that the first alternative may be the gasification of coal in hydrogen under pressure to produce town gas and coke, the reactive coke being used to produce the necessary hydrogen by the Lurgi process, I think he really implies a mixture of hydrogen and carbon monoxide by the Lurgi process. One cannot help wondering whether in its final form the two-stage process will be superseded by a one-stage process. Time alone will show and it is only by the accumulation of facts that the correct answer will be found.

In methane synthesis, too, the work on the semi-scale unit is proving most illuminating. It was only at the semi-scale stage that problems associated with heat dissipation—temperature control, catalyst production and so on—were resolved in the Fischer-Tropsch process, which bears so close a relationship to the Gas Research Board work on methane synthesis. It is only by intensive work at this stage that a commercial process can be evolved.

Finally, I would like to remind those who are engaged on this semi-scale work that they are pioneers for the gas industry in gaining an understanding of new branches of chemical engineering technique which may have many applications. For this reason, the plant operators and the plant designers in the gas industry are indebted to the Gas Research Board and its staff and will watch the extension of their work with great interest.

The **Chairman**: We have with us this morning Professor Newitt, Professor of Chemical Engineering at South Kensington, and you will remember that he was a scientific member of the Committee of Enquiry. May I call on Professor Newitt?

Light Under a Bushel

Professor **D. M. Newitt**: I think it is a little unfair of the Chairman to remind you that I was some years ago a member of the Committee which made some recommendations with which I do not think you were all in agreement at the time. I hope the events of last winter and the general critical situation have to some extent softened your feelings with regard to the Report we made!

I can speak on the Report of the Gas Research Board to some extent as an outsider not directly connected with the Gas Industry, and if I may be allowed to say so, the impression I get is that the Gas Industry is not fully alive to the importance of the work the Board is doing now. I have heard recently discussions on national fuel policy and the whole question of fuel distribution in this country. Very active proposals have been made on behalf of the mining industry and of the oil industry, but I look in vain for anything which shows that the Gas Industry is really fully alive to the enormous possibilities it has to meet the present situation. It is a source of power and energy which has a flexibility that no other source at the present moment can attain to. Therefore I think that you members of the Gas Industry are hinding your light under a bushel. You should come out well into the open and really make, if I may say so, a more concrete contribution to relieving the troubles of the Minister of Fuel and Power.

The Report of your Director indicates, to my mind, very clearly the direction in which you should go. I have mentioned before that the production of gas is a very flexible operation. It is a method of processing coal in which you get not only gas but solid fuel and which gives you every advantage in the way of storing up energy against the peak load. That is one very important factor.

The work of the Gas Research Board indicates also other methods by which you can still further increase the flexibility of your Industry, and it seems to me that the work has now got to a stage when you should consider large scale practical applications of some of it. Certainly the work on the synthesis of methane is very promising and has got to a stage when a rather stronger effort should be put into completing the pilot plant investigation. Some years ago I went to Poole and had the advantage of a long conversation with Mr. Moon and the scientists who were working on the problem of hydrogenation and methane synthesis, and in connexion with that I think most people who have been to Poole must have been impressed, as I was, by the admirable way in which the collaboration has taken place between what is, in effect, a production factory making gas, and the purely scientific work of the Gas Research Board. It is an extraordinarily fine piece of collaboration and it is one that should encourage the Director to extend this type of work in the Industry so that people whose main job it is to make gas can be kept in closer touch with the future potentialities of the new processes which are being developed.

Demand for Engineering Skill

There is one other aspect which was raised by Mr. Finlayson, and which I think is very important. The processes now being developed for complete gasification involve a plant which is of rather a unique character and differs very much from the orthodox gas making plant. In fact, it is plant which requires a good deal of engineering skill or, if I may say so, chemical engineering skill, in order to design and operate it. I was very glad to see that during the last few years, the Department at Leeds has rather changed its character and can now be called a Department of Chemical Engineering with a specialized interest in the gas industry. I think that is a move in the right direction. It means that you are training men in that Department who can not only look after the needs of the industry now, but will be able to look after the future developments which are forecasted in your Director's Report.

If I may make a little criticism, it is with regard to the remarks that have been made on the Lurgi process. We all heard about that some 10 or 15 years ago and a plant has been operated in Germany on this process for at least 10 years, and probably longer. I understand, however, from what I have heard

this morning that we still have not a Lurgi plant in this country. To my mind, that is a criticism of the Industry and I should like to hear how one can justify that long time lag if one is convinced that the process is of such promise as to be worth while a full scale trial. I think the Industry should by this time have carried out some tests in this connexion.

Your Director referred to some of the extra-mural work that is being done by the Board, and some of that comes under my direct notice because it is carried out at the Imperial College. If I may say, I think the Director has very shrewdly rationed out some of the more difficult problems with which he is faced and which we have been trying to tackle! I refer to those physico-chemical problems relating to the separation of multi-component gas systems by two-phase separation. We have been working on that now for some years. It is very difficult to obtain full data for a binary gas system; it involves a lot of work and a lot of analysis, but when you have three components it is worse still, and when you have five components, the problem is one of a most complex character. We were fortunate in getting a student on this research who came from China, and the Chinese are noted for the enthusiasm with which they carry out operations of the utmost monotony! He has worked on this problem for five or six years and has carried it to a stage when I think we know a good deal about the behaviour of the extremely complex system which we call coal gas.

I should like, as someone outside the Gas Industry, to congratulate your Director on the work described in the 7th and 8th Reports and more particularly on the programme of work which, to my mind, is exactly what the Industry wants at the moment.

Depressing

Dr. **Harold Hartley**: I hope I shall be excused if I say I find this a most depressing meeting! Perhaps that is enhanced by the fact that I regard the two Reports as rather depressing. They cover some 160 pages but only some 30 are devoted to utilization and half a page to coke.

In introducing the Report, Dr. Hollings, no doubt voicing the feelings of some members of the Council, appears to have surrendered to the criticisms at the Autumn meeting of the Institution of Gas Engineers. That is a matter of regret coming as it does from one whose own practice has been such an outstanding example, indicating what can be done by the research department in a large organization. Some problems have been taken up and dropped, but there is great need for utilization research, although there seems to be doubt in some quarters as to whether it is necessary. It is rather like the case of a manufacturing concern which markets a product without first carrying out market research, *i.e.*, a study of the purpose for which the product is needed. Hitherto, the Industry has really just carbonized the coal and then, in effect, has said to its members: "How interesting! Now sell the gas." Surely every endeavour should be made to find out what can be done with the product and to try to inform ourselves whether the product that is made available is the best.

The President has told us in his Address that the Gas Industry has several separate functions: the making of gas, the transmission and distribution of gas, and the provision of technical services concerned with the installation of appliances and the utilization of gas on consumers' premises. But we are still mostly concerned with the making of gas and, moreover, we do not seem to know what gas we ought to make. Again, the President, in his Address, said: "Often, the co-operative research laboratory is looked upon as a means whereby the day-to-day troubles of a business may be solved—troubles which it should be the duty of the firm itself to overcome." This Research Board will not be a success if it yields too much to the demand for solutions of day-to-day problems. It must do work of a background nature, and it is that which will help the Industry forward in the future. The generation of heat by combustion is important and we know very little about it. I am sure the section of the Industry concerned with utilization is only too anxious that the utilization problem should be investigated, and that section will do all it can to help. Therefore, I hope you will treat utilization more seriously in the future than you have done in the past.

The two Reports, together with the accounts for 1946, were unanimously adopted.

Neat Gas Cooking Burners

By Engineer D. TINBERGEN

(An Abstract Translation of an article published in *Het Gas*)

THE readers of *Het Gas* who regularly see the English trade papers will know that in England a serious attempt is being made, on the initiative of the South Metropolitan Gas Company, to replace the bunsen flame cooking burner by a non-aerated burner. This effort will, if it succeeds, bring about a revolution in the sphere of gas utilisation.

This application of the "neat gas" burners came as a surprise to the writer of the present article after the liberation—though we in our country were, nevertheless, not entirely unprepared for it. I need merely refer to the cooking rings with luminous flame, of which that designed by Mulder (the Hague ring) has an efficiency in cooking far above that required for the approval of cooking burners. The luminous flame has also been adapted under roasting pans for industrial kitchens.

The Friedman-Athill Works which design the rings with the neat gas flame in various models have been kind enough to send to our works in Amsterdam a two-burner ring to enable us to become familiar with it.

The possibility of soot formation is one of the most important factors to be considered. Naturally, the designers have paid special attention to this point. As emerges from an article in *Engineering*, two circumstances gave rise to the idea of adopting the neat gas burner. In the first place, the composition of lighting gas since the time when the gas flame began to be used as a source of light has appreciably altered. The content of luminous constituents is noticeably lower than before, so that the flame gives less light and is therefore less likely to form soot. In the second place, designers have succeeded in recent years in producing burners in which the outlet aperture is so shaped that the outflowing gas has a highly injecting effect on the surrounding air, while the flat shape of the flame offers a large surface to the air. The appreciable supply of additional air has the result that the full flame gas can scarcely be called "luminous" or "yellow": it is a blue flame with a narrow slightly yellowish marginal zone. With the flame turned down, when it has a smaller injecting power and is less flat, the luminous character becomes more apparent.

In the last two months that the gas ring has been in use at my home, we have been unable to find any trace of soot whether with the gas at full pressure or turned down and neither when the base of the saucepan is wet or dirty. Two months are not long for a practical test, but subject to this reservation the result is favourable.

Soot could, in my view, occur if one of the jets were damaged, thus enlarging the aperture of flow. The flame would then be larger and would assume a different, less favourable, shape with which soot might be likely to occur. It is also conceivable that dirt might accumulate at such places in the burner orifice as to alter its profile and alter the shape of the flat flame; in that case, the depositing of soot might be conceivable. The argument that a damaged or choked jet can be replaced has little value; a bunsen burner can also be cleaned, but unfortunately it is not always done. The idea is to find a burner which requires as little maintenance as possible. In the meantime I believe that the theoretical difficulties referred to above are only likely to occur in very rare cases; the experience met with Bray burners fitted *inter alia* in gas stoves is, of course, generally very favourable.

Efficiency of Neat Gas Burner

The efficiency of the burner has been determined by the Gas Association (in accordance with German standards). For a burner equipped with No. 00+ jets (gas consumption 440 litres/hr.) an efficiency was found of 55.9%, and for a burner with No. 0 jets (gas consumption 620 litres/hr.), 57.9%. The first mentioned consumption corresponds to that of very large standard burners. The test requirement reads: at least 53% efficiencies exceeding 60% are seldom found during test, while the good gas rings generally give values round about 58 or 59%. Accordingly, the efficiencies obtained may be described as "reasonably good." Although I cannot say with certainty, I should not be surprised if the efficiency of English bunsen cooking burners were not on an average lower than that of ours, so

that in other words the Friedman-Athill gas ring would make a relatively better showing in England in regard to efficiency.

In the meantime it should be borne in mind that we are here dealing with laboratory efficiencies. Considerable importance attaches, on the other hand, to the "efficiency in practice" which as the result of various circumstances turns out quite differently. For that purpose it would be necessary to ascertain how the efficiency changes after a large number of hours in use, both in the case of bunsen burners and in the new burner. I have not done this yet. In comparing the two types, the following may, however, be said: in the bunsen burners one of the causes of reduced efficiency in practice is that the vertical distance between the burner and the bottom of the saucepan becomes altered by fouling or by an alteration in the indented design. This is precluded with the new burner. The rigid construction of the whole guarantees a constant distance. The plate which is at the same level as the cooking ribs affords, moreover, greater ease in the use of small saucepans. Moreover, the burner getting out of adjustment (insufficient primary air and sometimes too much gas) ofter leads to a reduction in the efficiency; this defect too need not be feared with the new burner owing to its extremely simple design.

Accordingly, although the burner in the laboratory is not so economical as we might desire, there is, in my view, every chance of it proving better in practice than a number of bunsen burners.

The uniformity with which the bottom of the saucepan is heated is very good; the gas ring also answers the test requirements for simmering rings. This cooking burner is therefore a simmering burner when it is turned down. This is a combination for which the Gas Industry in our country as well has been looking for years and the nearest serviceable solution to which has been the Inventa gas ring No. 701 of the A.S.W. It is quite possible that this extremely important asset will finally lead to the yellow flame superseding the blue flame. This has always been a weak point of the gas cooking burner; when turned right down, the irregularity in the heating (even in the case of the single burners which are the most favourable in this respect) is greater than with an electric hotplate and still greater than with the old fashioned petroleum stove. The reduced risk of burning will be greeted by the housewife with joy—is it not time we started in this respect also talk of house-husbands?—moreover, it will lead to very much longer life of the saucepans.

The possibility of regulating the burner is, as will be understood, very good. Owing to the fact that the full gas pressure is obtained at the jet orifices—as compared with the standard cooking burner with a pressure of 2mm column of water—the pressure at the burner orifices even when the gas is turned down is much higher, so that the burner is always more resistant to draughts. A slight drawback of the high velocity of flow is that the match is sometimes blown out when one wants to light the burner.

It is more difficult to judge the regulating possibilities than with a standard type of gas ring. In the first place, the burner is less noisy so that it is impossible to judge by ear; in the second place, the turned-down flames are hidden by the plate so that even when the pan is removed it is necessary to bend down in order to see the position of the flame.

Fig. 1.

In a gas cooker produced by Friedman-Athill, a polished metal mirror has been provided in the horizontal base plate of the frame by means of which the oven burners can be watched without stooping. Such a solution is equally possible for cooking burners (no matter what their design) and is no less important. Fig. 1 shows how the housewife, thanks to a two-sided mirror, can keep an eye on the two burners even when using a large saucepan and therefore also judge their position when turning down the gas. Only with the aid of such a mirror can the housewife derive full benefit from the advantages afforded by gas compared with electricity—namely that the extent to which the burner is turned down can be seen at any moment.

Cleaning Facilities

Anyone judging the cleaning facilities of the burner readily commences by being somewhat sceptical in regard to the new design. The bunsen burner is detachable and therefore easy to clean. It is true that the fixed burner head can be removed with a key but the housewife is not a gasfitter and she will be well advised to leave the burner alone. Do not the very fine orifices become choked? In practical use I have seen no sign of it; on the contrary, all the flames have burned properly for two months. The higher gas pressure makes the likelihood of milk and so on getting into the burner very improbable as long as the jets are alight. Finally, the plate affords a better protection for the orifices than is the case with the standard burners. Even if food which boils over does not drip along the edge of the plate, it will spread out in a film over the metal part towards the centre and then flow downwards, but even then it will not easily reach the burner orifices.

Although it is somewhat beside the point in judging a burner, in principle I should nevertheless like in passing to refer to a few other characteristic features of the rings illustrated. Praiseworthy is the use of boiling rings which are made of a very good cast aluminium alloy. The rings are more tasteful in appearance and have stood up to practical use very well. A serious fault is that there is no stop on the taps for the smallest setting. In addition, the common gas supply pipe (see Fig. 2) is so small that lighting the second burner brings about an appreciable reduction in pressure on the first burner. Although the gas ring is of very handsome appearance, one or two things may be said about the possibility of cleaning the triangular inside plates. According to Dutch ideas, the distance of 24 cm. between the burners is slightly too small. The gas taps seem to me to be fitted too low to ensure easy operation. The reader must, however, bear in mind that these remarks are for the greater part incidental and that they in no way affect the principle of the burners.

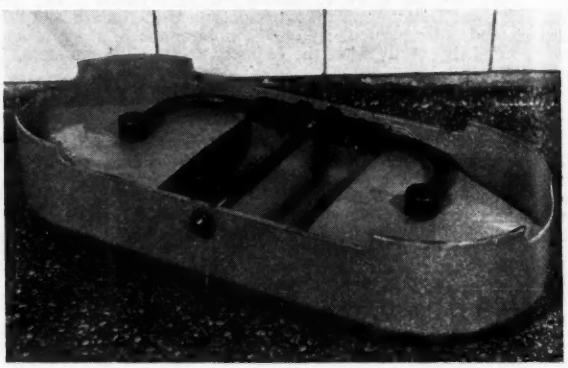

Fig. 2.

I hope that the forgoing will make it clear that the attempt made by very skilled designers to replace the bunsen burner by a cooking burner with a yellow flame is deserving of our full attention. The sooner the Netherlands Gas Industry (by importing, construction under licence, or the design of Dutch variations) obtains the combined boiling and cooking burners, the better it will be. There is, however, reason for undertaking practical tests on a large scale and at least as the result of the appearance of this new design, technical competition may be expected between blue and yellow flame which will redound to the benefit of both systems.

Falkirk Town Council at a special meeting last week considered the implications of the reimposition of Purchase Tax on gas and electrical appliances as applied to local industry. Councillor Middlemas moved "that this Council, while fully conscious of the need for National fuel economy, is of the opinion that the Government should reconsider the reimposition of Purchase Tax on non-luxury type of gas and electrical appliances, with particular reference to cookers." He pointed out that the light iron castings industry was the staple industry in Falkirk, and his information was that orders were being cancelled as a result of the tax. The housing programme would be held up as a result of the decrease in the production of cookers which would inevitably follow. The motion was unanimously approved and copies sent to the Chancellor of the Exchequer and the three local Members of Parliament.

Furnaceless Heating and Small Gas Furnaces*

By J. F. WAIGHT and J. PALSER,
Industrial Department, City of Birmingham Gas Department

(*Continued from p. 346*)

WHERE it is necessary for a furnace to accommodate a wide range of shape and size, an adequate case cannot be made out for the use of concentrated combustion burner systems, since in such furnaces no advantage would be shown over other and, perhaps, simpler types of burner.

Following is a list of processes to which the "C.C." burner has been applied in this country:

Local heating.
Local hardening.
Non-ferrous billet heating for rolling.
Bolt heading.
Steel forging (including drop stamping off the bar).
Rolling.
Upsetting.
Continuous billet heating.
Fire welding.
Tube annealing and upsetting.
Brazing cycle parts, including the liquid bath method
High speed steel hardening.
Tungsten wire heating.
Aluminium melting and holding.
Zinc base metal melting.
Ladle heating.
Glass melting and glory holes.
Vitreous enamelling.
Salt bath hardening and salt tempering.

Other processes of a confidential nature, and some in the development stage, have not been included.

While it is true to say there are many more fields of application yet to be investigated, we do not want to create the impression that concentrated combustion burners are suitable for all purposes, and in that respect careful consideration must be given to each job. Six processes or installations have been selected for description and illustration where furnace structures have been eliminated altogether or reduced to minimum dimensions. These are as follows:

Automatic hammer hardening.
Automatic spanner jaw hardening.
Batch type forge furnaces.
Automatic pin heating.
Automatic tube heating.
"Cyclone" furnace with automatic temperature control.

Direct Heat Application

Hammer hardening was one of the earliest applications of the "C.C." burner system, and an instance where the furnace has been eliminated entirely. (Fig. 3.) Two parallel sets of burners are arranged horizontally opposing each other, the positions of which are adjustable to allow for the various sizes of hammers. The hammers are pushed along in a pack past the burner tunnels, both ends being heated at the same time, and ultimately individually quenched in a tank of water. The feeding machine incorporates a variable throw pusher mechanism to push the hammer heads horizontally along water-cooled runners. The advantages of this method over the orthodox oven furnace or lead bath are:

(1) Fuel economy—no furnace to heat up; can be put into operation 10 minutes from lighting.
(2) Both ends are heated at the same time—heated once only—simplified quenching.
(3) No lead or bath replacement.
(4) Consistent hardening with automatic feeding.
(5) Can be operated by semi-skilled or female labour.
(6) More gradual zones of transition from the hardened or untreated areas.

The original installation which is still giving satisfactory service after three years' use, includes a pair of 9-tunnel burners opposing each other, the individual tunnels being arranged at 1½ in. centres. This plant was designed to operate with a range of hammers varying from 4 oz. to 5 lb. in a wide variety of shapes. If the 1 lb. engineers' hammer is taken as an example, the production of the machine is 1½ gross per hour, with a gas consumption of 400 cu.ft.

Spanner Jaw Hardening

A further direct heat application was used for the local hardening of carbon steel jaws of peculiar shape for special spanners. The requirements were to heat locally and automatically the serrated or grip portion of the jaw. This was accomplished by the use of a three-tunnel burner firing downwards with the outlets close to the serrations. A rotating table containing 50 radial slots of suitable size was used, each slot arranged to accommodate one jaw. The rotation speed of the table was one revolution in six minutes giving an output of 500 jaws per hour. The jaws, after passing under the tunnels, were ejected immediately into the oil quenching tank below.

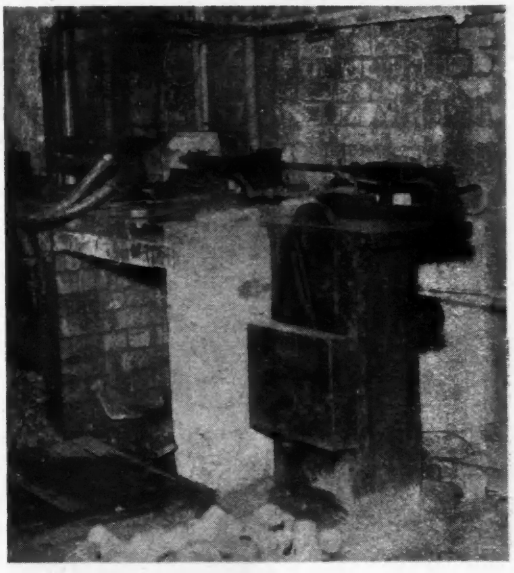

FIG. 3.—*Hammer hardening with the "C.C." burner.*

The reduction of furnace structures is illustrated by the following comparison of the old and new furnaces now in use for the heating of bar ends for spanner manufacture. Both furnaces are fired by town gas:

	Old furnace—double sided	New furnace—single sided
Bricks used in construction ...	360	12
Time to build furnaces ...	2 days	2 hours
Floor space occupied	5.625 sq. ft.	1.25 sq. ft.

The time required to heat up the old furnaces from cold to a temperature of 1,250° C. was 1½ hours, and they were left on continuously for the whole day, necessitating shifts being arranged to maintain production. The new furnaces reach temperature from cold in 11 to 12 minutes, and are put into operation immediately. Owing to this high speed of heating, the furnaces are now shut off, even for a few minutes hold up due to tool trouble. The following is a summary of a typical day's work:

Process	Steel upsetting
Diameter of bars	¾ in.
Heated length	6 in.
Temperature of heated length	1,250° C.
Weight	1 lb. each
No. of bars	720
Heated weight	720 lb.
Total gas used	3,200 cu.ft.
Gas used per lb. of steel heated overall	4.4 cu.ft.
Total time furnace alight	7 hr. 25 min.
Actual working time	6 hr. 36 min.

Although the furnace was shut down five times during the day for various reasons, only 49 minutes were lost including the initial heating up time. The output per furnace is understood to be up by 7% with the new system.

In the new furnace from which the test figures were obtained (Fig. 4) the "C.C." burner system is fitted on top of the furnace to form the roof, and fires downward directly on to the work. The door slot is 9 in. wide by 1½ in. high, through which the waste gases are allowed to discharge in a similar manner to the old furnace. The walls and base are built with 3 in. firebrick. The working chamber dimensions are 9 in. wide by 6 in. deep by 4½ in. high. The simplicity of construction enables the users to build their own furnaces to fit varying jobs. A total of 14 furnaces are now installed in one factory with additional units under consideration.

The old furnace (Fig. 5) was double-sided, with door slots on opposite sides, each measuring 12 in. wide by 1½ in. high, immediately

* Paper before the Sheffield Section of the Institution of Production Engineers, Feb. 19.

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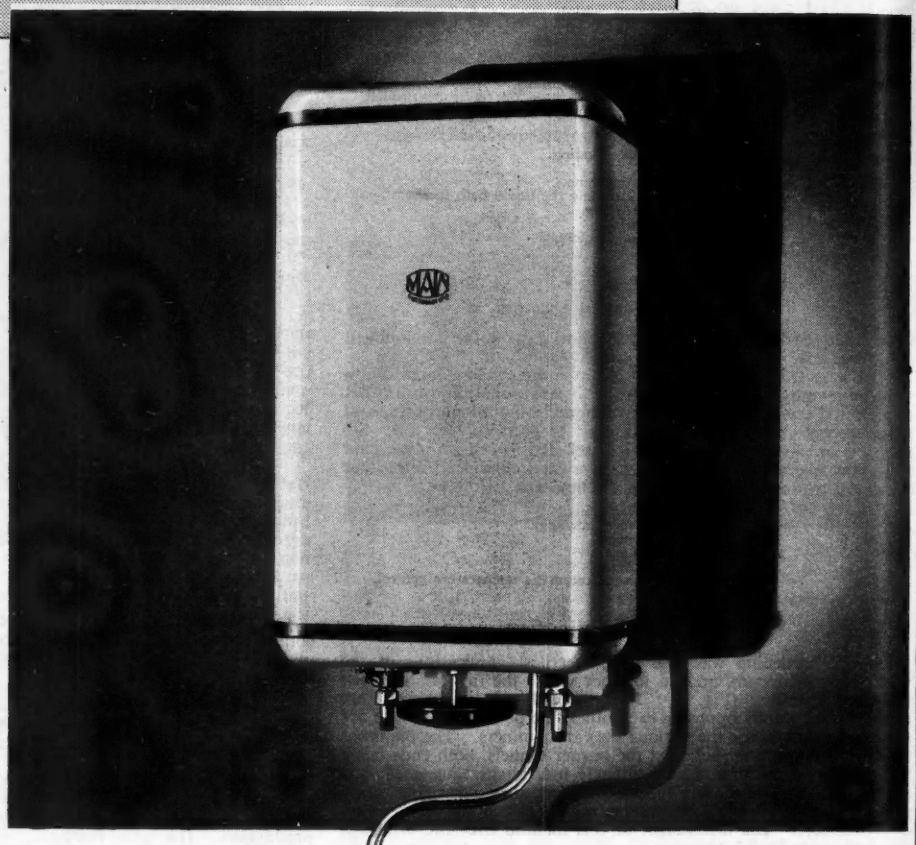

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above which was positioned a burner pitching downwards at an angle of 30° towards the centre of the hearth tile, the waste gases being allowed to discharge through the slots. The side walls were constructed with 4½ in. thickness of firebrick backed up with 4½ in. insulating bricks, the base with 3 in. insulation and 3 in. firebrick, and similar thicknesses for the back and front walls and the roof. The internal dimensions of the combustion chamber were 1 ft. 3 in. deep by 1 ft. wide by 9 in. high.

FIG. 4.—*Spanner jaw hardening*

Automatic Pin Heating

Investigations are being made by nut and bolt manufacturers into ways and means of obtaining automatic delivery of heated pins to the bolt heading machines. These investigations were started mainly because of labour problems connected with the usual batch type of furnace, due to the fact that for certain kinds of bolt heading machines it is necessary for the furnace operator to stand close to a furnace working at a temperature of 1,250-1,300° C. to feed the machine operator with pins at a rate varying from 10 to 20 per minute, depending on their diameter. These batch type furnaces may be single, double, or four-sided, each side being built up with perforated or "holed" bricks arranged to suit the diameters of the pins. The pins are inserted through the holes into the heated chamber, to a position to give the required heated length. The furnace operator handles each pin twice.

FIG. 5.—*Old double-sided furnace*

After many teething troubles which were mainly mechanical, an automatic furnace machine has now been in operation for many months. (Fig. 6.) While it is hand fed at present by an operator in comparative comfort, the ultimate idea is to fit an automatic hopper feed. The machine was designed to deal with pins varying from $\frac{3}{8}$ in. diameter by 5 in. long to $\frac{7}{8}$ in. by 15 in. long.

The pins are conveyed horizontally at 2½ in. centres in a vertical position through the slotted base of the furnace on a cast iron pintle attachment chain, to each link of which is fitted a small cast iron flat bar with a centre boss drilled 1 in. diameter to receive the pins. The chain travels below the furnace base plate. Beneath the chain is a supporting bar which can be adjusted to suit the length of pin, and when the end of the bar is reached, the pins fall down the drop chute to the heading machine. The chain is automatically tensioned by its own weight. The speed is variable and driven by a fractional horse power electric motor. The heated zone is 4 ft. 6 in. long by 7½ in. wide, and fired direct by nine "C.C." burners, staggered and cross firing at right angles to the flow of pins.

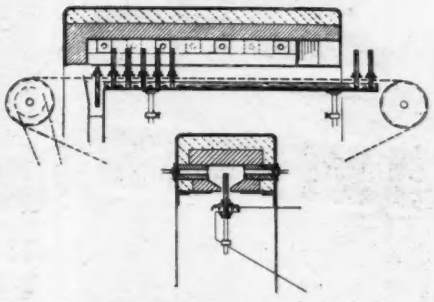


FIG. 6.—*Automatic furnace machine*

Taking $\frac{1}{4}$ in. and $\frac{3}{4}$ in. diameter pins as examples, the following results are obtained during a working period of eight hours, the temperature of the pins being raised to approximately 1,250° C. in each case:

Diameter of pin	Heated length	Output per min.	Average daily output	Heated weight	Average daily gas consumption
$\frac{3}{4}$ in.	2.5 in.	12	30 gross	1,095 lb.	9,000 cu.ft.
$\frac{1}{4}$ in.	1.75 in.	18	50 gross	1,351 lb.	9,000 cu.ft.

The discrepancy between the output figures per minute and the total for the day is due to various breaks for meals and tooling, &c. It is possible, without stoppages, to heat up to 40 gross of $\frac{3}{4}$ in. pins and 60 gross of $\frac{1}{4}$ pins per eight hour shift, which would reduce the gas consumption to approximately 5 cu.ft. per lb.

An experimental furnace has been installed for heating straight tubes progressively and automatically. Briefly the unit consists of two horizontal zones and a short high temperature section with a long preheating chamber. The high temperature end, 27 in. long by 4 in. square, is heated by a pair of 3 in. centre 9-tunnel burners opposing each other, the high velocity gases being directed on to the centre line of the tubes. The preheating chamber, 15 ft. long, is heated by the products of combustion from the burners.

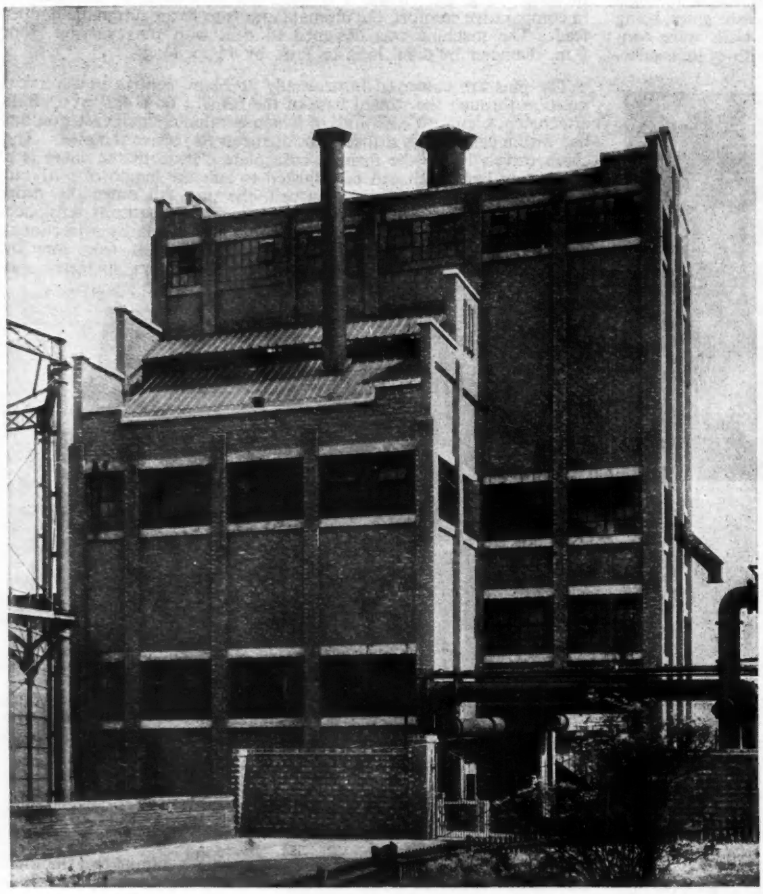
The firm interested in the experiment were responsible for all constructional work, including the automatic feeding mechanism. This ingenious arrangement, the details of which are confidential, is controlled hydraulically to give an infinitely variable speed up to 110 ft. per minute. The tubes are fed into the preheating chamber and emerge from the high temperature end at approximately 700° C. The speed is adjusted to suit the gauge and diameters of different tubes. The working temperatures of the zones are between 500-1,200° C. and 1,540° C. respectively. Gas consumption figures have not been obtained on this installation.

Details of Heating Speeds:

Dimensions of tube	Weight per ft. lb.	Speed of heating ft. per min.
1.187 in. by 15 g.	0.86	30
1.375 in. by 12 g.	1.511	14.5
1.000 in. by 17 g.	0.565	40
1.062 in. by 20 g.	0.386	48
1.344 in. by 10 g.	1.5	13
1.000 in. by 23 g.	0.25	95

While these high speed heating figures are interesting, and the surface of the tubes are remarkably clean, thus reducing the pickling time, there are disadvantages with certain tubes from the metallurgical angle. Investigations are taking place at the present time, and developments are expected shortly.

This small furnace illustrates the use of "C.C." burners where the hot gases are not directed on to the work. It is not always convenient to use confined heating spaces; for instance when dealing with steel forging operations, especially where the steel has been partially forged



GLOVER-WEST

Vertical Retorts

at

HIGH WYCOMBE

ARCHITECTURAL FEATURES

From the layman's point of view, perhaps the most interesting feature is the attempt to produce in an essentially industrial building a pleasing architectural appearance. The steel frame-work of the building has been encased in brickwork, and the coal-receiving annexe and coke hoppers are built as integral features of the main building. A liberal use has been made of steel-framed windows for producing maximum natural lighting and ventilation. Parapets with "Snowcrete" coping form a pleasing finish to the skyline. Rain-water pipes are not visible, being taken down internally. The full effect of the building when viewed from Desborough Road is masked to some extent by the abutment of the old horizontal retort house, but when this is dismantled and the new retort house extended it will appear as an independent and symmetrically designed structure.

WEST'S

GAS IMPROVEMENT CO., LTD.

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Telegrams: Stoker, Manchester.

London Office: Columbia House, Aldwych W.C. 2.

Telephone: Holborn 4108-9.
Telegrams: WESGASCO, ESTRAND.

and is irregular in shape, thus requiring additional furnace heating space. A number of these furnaces have been in use satisfactorily with automatic temperature control for over 15 months. The following is a brief description and performance details of a unit with hearth dimensions 18 in. square and a vault to hearth ratio of 1.5.

The casing is a fabricated mild steel structure, elliptical in shape and supported on a tubular underframe. The lining which follows the contour of the casing, is built with an outer 6 in. course of "insulation bricks" and an inner 4½ in. course of "Scotch" firebricks. Across the centre line is the hearth tile supported by suitably spaced

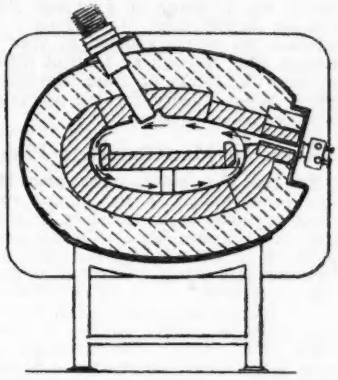

FIG. 7.—"*Cyclone*" *furnace with automatic control*

bricks. An 8-tunnel burner, spaced at 2 in. centres, is fitted at an angle on one side of the furnace with the tunnel outlets close to the underside of the roof to obtain the maximum radiation. The gases sweep across the face of the arch at a high velocity to the opposite side, and then down under the hearth, returning to the burner to complete the movement, eventually discharging through the door slot. By this method of heating, a live hearth is obtained without having an excessive temperature below, which is a weakness usually associated with underfired furnaces. For use in connexion with the automatic temperature control equipment, a carborundum tube is positioned through the roof of the furnace, the closed end of which is fitted to the inner face of the brickwork with a cavity cut around the tube 1 in. wide by 1 in. deep.

The high rate of heat transfer and high heat potential obtained with this type of furnace makes it essential to fit automatic temperature control. There is a tendency on the part of forgers when working batch furnaces without temperature control or indicators, to exceed the maximum temperature requirements, irrespective of the type of fuel used.

It may be argued, if this statement is true, then tons of overheated forgings (not burnt) have been satisfactory in use, but surely this should be avoided if possible to produce correct forgings, save steel, save fuel, and to increase the life of the furnaces under the same conditions. From experience, this question of overheating is not confined to the forging industry, but is applicable to all forms of heating processes where the temperatures are visible. Performance (Fig. 7):

Furnace adjustment	Gas rate cu.ft./hr.	Gas pressure at burner	Air pressure at burner	Furnace atmosphere CO_2	O_2	CO_2
Control valves open ...	1,270	3 in. w.g.	1.5 lb./sq.in.	12.7	0.6	Nil
Control valves closed (on by-pass only)	390	1 in. w.g.	4.5 in. w.g.	13.0	Nil	0.2

Summary of Test Readings :	
Size of furnace hearth	18 in. by 18 in.
Average gas rate	951 cu.ft./hr.
Furnace temperature	1,270 ± 10° C.
Diameter of bars	1½ in.
Weight of steel per hour...	250 lb.
Gas used/lb. steel heated (not including heating up furnace)	3.81 cu.ft.
Weight of steel heated per sq. ft. hearth area/hour ...	111 lb.
Heating Up (from overnight shut down) :	
Time required to heat furnace	37 min.
Temperature attained	1,270° C.
Gas consumed	800 cu.ft.
Gas rate per hour...	1,280 cu.ft.

Temperature Control

The high temperatures used in steel forging furnaces presented a problem to the temperature control instrument makers in view of the sensitive element required to measure the temperature in the furnace itself. Tests have proved that no thermocouple was suitable even when great care was taken with its thermal and mechanical protection. However, these difficulties have been overcome by using a total radiation unit, which is now available.

The heat sensitive unit is situated outside the furnace and is focussed on to the hot end of the carborundum sighting tube. The heat rays are concentrated by special lens on to the thermocouple; thus the temperature of the furnace is measured without the sensitive element being subjected to the actual high temperature.

The controller, which may be indicating or recording, can be used in a number of ways, but for forging furnaces a simple type known as the by-pass system has been adopted. By-pass supplies are arranged around the main valves on the gas and air mains. The main gas valve of the butterfly type is motorized, and is connected by means of an adjustable link to a simple butterfly valve on the air supply, both valves to work in unison after initial adjustments have been made.

A certain amount of gas and air is allowed to pass to the furnace all the time, the by-pass valves being adjusted to maintain an empty furnace, say, at 1,000° C. A second supply sufficient to take care of the load and the extra temperature required, is operated by the controller. Practical results have shown that the temperature is controlled within plus or minus 10° C. when working at 1,300° C.

Pulverized Fuel Conference

The Pulverized Fuel Conference under the auspices of the Institute of Fuel will be held at Harrogate from June 3 to 6. A very full programme has been arranged, a summary of which is given below.

JUNE 2.

12 noon to 6 p.m.—Registration at Conference Office at the Royal Hall.

JUNE 3.

10 a.m.—Pulverized Fuel Conference Committee, Council Chamber, Municipal Offices.

10.30 a.m.—Opening of Conference. Chairman: B. Samuels. Civic Welcome by the Mayor of Harrogate. Address by the Rt. Hon. Emanuel Shinwell, Minister of Fuel and Power. Address by Dr. C. H. Lander, C.B.E., President of The Institute of Fuel.

12.30 for 1 p.m.—Conference Lunch, Hotel Majestic.

2.30 p.m.—First Session. Chairman: Sir Ernest Smith, C.B.E. Influence of national fuel policy and town planning, and methods of mining and coal preparation on the use of pulverized fuel; statistics; general economics; bulk supply.

8.30 p.m.—Civic Reception and Dance, Royal Hall.

JUNE 4.

10 a.m.—Second Session. Chairman: Dr. A. Parker, C.B.E. Drying and grinding of coal; pulverizers; handling, storing, transport, bulk supply, sampling and size determination of pulverized fuel.

2.30 p.m.—Third Session. Chairman: Sir Johnstone Wright, M.Inst.C.E., M.I.E.E. All aspects of burning of pulverized fuel, with special reference to larger power-plant boilers; combustion problems common to all plants, especially connected with burners, temperature control, &c.

2.30 p.m.—Tour, especially for ladies, to gardens of Harewood House, the home of the Earl of Harewood, K.G., and H.R.H. The Princess Royal.

7 for 7.30 p.m.—Conference Dinner, Hotel Majestic.

JUNE 5.

10 a.m.—Fourth Session. Chairman: C. H. Sparks, M.A., M.Inst.C.E. Effect of ash on design and operation of plant; deposits on heating surfaces; corrosion; refractory problems; ash and dust removal and handling; utilisation of dust and ash.

2.30 p.m.—Visits to the Kirkstall Power Station, Fountains Abbey and Ripon, Messrs. Rowntree & Co., Chocolate and Cocoa Factories, York, Messrs. Joseph Terry & Sons, Ltd., Chocolate Factories, York.

JUNE 6.

10 a.m.—Fifth Session. Chairman: Dr. D. T. A. Townend, D.I.C. Pulverized fuel for gas turbines, locomotives, ships, metallurgical furnaces, &c.; research and development problems; special points not dealt with in previous sessions.

2.30 p.m.—Sixth and Closing Session. Chairman: Lord Hyndley, G.B.E. A Summing Up by the Chairmen of the Sessions.

8 p.m.—Conference Ball and Cabaret, Royal Hall. Reception, by Mr. B. Samuels, Chairman of the Pulverized Fuel Conference Committee, and Mrs. Samuels. Dancing 8.30 to 2 a.m. Cabaret.

An exhibition of models of pulverized fuel plant, auxiliaries and other apparatus allied to the subject of the Conference is being arranged at the Royal Hall.

Burnley Gas Department are seeking authority to borrow £10,000 for new gas meters. It has been found necessary to replace 1,124 dry meters and 899 prepayment dry meters. On March 31, 3,219 old meters were in need of attention. Application is also being made to borrow £15,000 for hire purchase gas appliances.

COMPANY MEETING

Associated Gas and Water Undertakings, Ltd.

The Fourteenth Ordinary General Meeting of Associated Gas and Water Undertakings, Ltd., will be held at the May Fair Hotel, London, on May 29.

The CHAIRMAN, Mr. W. H. Bennett, M.Inst.Gas E., in his statement circulated with the report and accounts, says: The Government's expressed intention to nationalize the coal, transport, electricity, and gas industries has become an accomplished fact in the case of coal mining companies and their subsidiaries. It had long been generally acknowledged that some measure of reorganization, grouping, and modernization of the coal industry was desirable and it might have been thought that here the Government might achieve some success, although they completely ignored the industry's own plans to this end—plans which had been worked out by those with the most intimate knowledge of the subject. The National Coal Board has been functioning now for only a few months, but in that short time its activities have aroused open criticism from many quarters, notably from the Government's own supporters in the House and from Trade Union leaders outside. What the position may be when and if the Government's full programme of nationalization is brought to fruition cannot be visualized at present, but so far the coal experiment is not encouraging.

Ill-conceived Nationalization

The Bills to inaugurate the nationalization of the transport and the electricity supply industries are now before Parliament and have already been the subject of an extraordinarily large number of Government amendments, which would appear to indicate that these proposals are as ill-conceived as they are ill-timed. Nevertheless, it is evident that the Government intends to rush these highly contentious measures through Parliament, regardless of the fact that, apart from the proprietorial interests concerned, they are of vital importance to the whole industrial system of the country, which is already faced with unparalleled difficulties and frustrations, many of them the direct result of the present bureaucratic system of "controls."

The Gas Industry, looking to its own future, views with grave disquiet the general structure of the Electricity Bill, which places autocratic power in the hand of one Minister who is licensed to seize the total assets of the electricity industry, compensating its present owners on a basis which, to any fair-minded man, is almost confiscation.

Stock Exchange quotations are a day-to-day index to prices in the stock and share market and are affected by many influences which have no relationship to the basic value of the assets concerned. Yet this is the basis adopted in the Electricity Bill for all companies whose capital is quoted on the Stock Exchange. The Electricity Stock to be issued to the dispossessed owners will doubtless yield some 2½%, entailing grave hardship to thousands of small investors.

Stockholders of this Company have a particular interest in the Electricity Bill, as four of our larger subsidiary companies owning electricity as well as gas undertakings will, under the provisions of the Bill as it stands at present, be acquired in total by the Electricity Authority. Whether these gas undertakings will be administered by the Area Electricity Board and what will happen if an Area Gas Board also comes into being, is not at present clear. This is a matter of some concern to this Company, as our total investment in these four subsidiaries represent 47% of our total assets. In the case of one of them, the Guildford Gas Light and Coke Company, the gas undertaking serves ten times the number of consumers supplied by its electricity department, which operates in a comparatively small area, yet, unless the position is rectified before the Bill is on the Statute Book, all these consumers will have to look to the Area Electricity Board for service and supply. The Godalming Gas and Coke Company, Ltd., will be affected also, as its officers are at present the same as at Guildford. New officers will have to be appointed and the extra cost must eventually be borne by the consumer.

Fuel Crisis

Since the beginning of the year this country has been overtaken by the greatest economic crisis in its history—a crisis brought about by the lack of coal and the consequential curtailment of gas, electricity, and solid fuel supplies. I would make it quite clear that the Government was informed by industry that this state of affairs was bound to mature during the year and that the severe weather, while it aggravated the position, merely hastened the inevitable. The primary cause of the crisis was bad planning by the Government and their refusal to listen to the advice of those best qualified to judge the situation. One fact was brought home during this period of shortage: this was that the system of grouping, which is the essence of Gas Holding Company practice, went a long way towards obviating distress which would otherwise have been the lot of many consumers. Your Company was able to assist one-fifth of its undertakings who would have had to shut down through lack of coal by transferring quantities from more fortunate subsidiaries within the Group. This, I would say, after the companies concerned had been informed by the Ministry of Fuel and Power that they could give them no further help. The Ministry itself made no endeavour to follow the system adopted by your Board of supplying undertakings who, through no fault of their own, were in a bad position, from the stocks of those who were rather better placed. Is this a happy augury for the administration of the Industry under Government auspices?

Strain on Manufacturing Plant

Throughout this year gas manufacturing plant in every part of the country has been strained to the utmost and, in order to save coal, it has at times been necessary to reduce pressures. This has caused great inconvenience to many people, but every effort has been made to see that cooking times were affected as little as possible and that industry essential to the well-being of the country was kept going to the fullest capacity. Again, in order to save coal, the maximum amount of water gas has been manufactured, resulting in a large drop in the quantity of coke available for sale to the public. In our organization we have throughout borne in mind that we direct companies whose prime duty it is to supply gas and that coke is a by-product of our efforts to this end.

Notwithstanding the threat of nationalization, within our Group plans have been put into effect for the provision of bulk supplies between various undertakings and the erection of further manufacturing and storage plant, in order to meet the ever increasing load, is going ahead, as it is our intention to assure the consumer of an adequate supply, even should the control of these undertakings be out of our hands in the future.

The Accounts

The accounts call for little comment, as, in view of this Government's policy in regard to the nationalization of public utilities, it has been a year of conservation rather than expansion. Turning to the balance sheet, you will observe that investments have decreased only by £2,000 in total, although there has been some re-orientation as between investments in subsidiary undertakings and those in other companies. Investment in freehold property has increased from £58,750 to £62,300. Amounts loaned to subsidiary undertakings have dropped from £47,350 to £2,900. On the other hand, loans to other companies have increased by £133,000.

In comparison with the previous year total revenue from all sources shows a slight decrease of £1,194. In detail, dividends and interest on investments show a drop of £1,817, which is accounted for by the sale of certain preference stocks of a non-voting character during the year to Mar. 31, 1946, to which I referred in my statement last year. This is largely offset by increases in interest on loans and other income including rents receivable.

Regarding expenditure, the only item calling for explanation is income tax. This shows an increase of £2,920, but the total includes a non-recurring charge of £3,281, which has been met out of current revenue although full provision had been made for this item in past years and set aside in reserve for taxation in the balance sheet. If the Proprietors approve the Directors' recommendation regarding the declaration of final dividends, the sum of £35,858 will remain to be carried forward, representing an increase of £3,358 over the amount brought in.

It remains for me to pay tribute to the work done by local Directors and Officers of our associated undertakings and also by the officials at Head Office during the past year. Satisfactory results have been achieved, and I desire to express our sincere appreciation of their endeavours in a year which has brought much frustration to those attempting to plan ahead.

The First of two modern basic open-hearth furnaces at Stewarts & Lloyds' Clydesdale Works, Mossend, had gas put in on April 21 and was given its first charge of 60 tons next day. Two 50-year-old furnaces were closed down, and as a result 200 workers were idle. It had been hoped to start working steel with the two new furnaces, but only one is going into production. The Company intends to build a total of four new furnaces for a new tube mill which is included in the improvements to be made at the works.

Company Results

Parkinson & Cowan, Ltd.—The Directors' report summarizes the consolidated profit and loss account and shows a gross profit of £180,533 (against £128,563 last year). The consolidated net profit, after depreciation, taxation, &c., is £58,041 (against £15,008). This improved position enables the Directors to recommend a 5% Ordinary dividend, and on that basis the statement shows an undistributed surplus of £19,061 on the year's working, which increases the carry-forwards in the subsidiary Companies and the parent Company by £15,770 and £3,291 respectively. The structure of the combine has been considerably simplified by the elimination of all sub-subsidiaries. The present constituent Companies are all now direct subsidiaries of the parent Company. The amount invested in plant and machinery has increased by £62,000 to a total of £248,000. In addition, large sums have been out of revenue in reorganizing factories and £55,000 in depreciating fixed assets. An increase of £46,000 in stocks arose from increased costs of materials and labour. The physical stock was actually lower.

In his statement issued with the accounts, Lieut.-Colonel H. W. Woodall points out that during 1946 they continued the systematic reorganization of their factories and suffered their full share of raw material and labour shortages. Great improvements were made in factory layouts and they have installed a large amount of the latest and best mechanical plant in replacement of less efficient equipment. They have also devoted much money and thought to improvements in working conditions by the installation of up-to-date heating, lighting, welfare and canteen facilities. The new year opened with full order books and high hopes, which were bitterly dashed by raw material and fuel crises. Many factories were closed by the electricity cut and the direct and consequential losses which were incurred were serious. The Company's achievements this year will depend largely on the availability of raw material and the extent to which the crises of last winter can be avoided or ameliorated next winter.

Gas Stocks and Shares

The opening of a new three-weeks account on the Stock Exchange was marked by an expansion in business, and a general reluctance to sell resulted in an upward price tendency. British Funds continued to show a slight improvement. With a few outstanding exceptions, price changes in the industrial market were small and upwards. Imperial Chemical Industries at one time reached a new high level of 51s. 9d. Ex-dividend quotations for gas stocks were slightly down, but all other changes in the gas stock market indicated increases. Associated Gas and Water Ordinary, which had been marked down to 20s. on an ex-dividend basis, rose to 21s., and South Eastern Gas Corporation Ordinary advanced by 9d. to 21s. 3d. Price changes recorded during the week were as follows:

OFFICIAL LIST

Assoc. Gas & Water ord. ...	19/ — 21/	+ 1s.
Do. deferred	19/ — 21/	+ 6d.
Commercial ord.	81 — 86	+ 1
Do. 5 p.c. irred. deb. ...	118 —123	+ 1
Croydon 5 p.c. perp. deb. ...	120 —125	+ 1
Gas Consolidrtion 4 p.c. red. cum. pref. (x.d. May 14) ...	19/6— 21/6	— 6d.
Gas Light & Coke 4 p.c. con. pref.	101 —104	+ 1
Do. 3 p.c. con. deb.	95 — 98	+ 2
Imperial Continental Cap. (x.d. May 14)	128 —133	— 4
Newcastle & Gateshead ord. ...	23/6— 25/6	+ 6d.
Sheffield cons.	138 —143	+ 1
South-Eastern Gas Corp. ord. ...	20/3— 21/3	+ 9d.
South Metropolitan ord.	94 — 97	+ 1
Do. 3 p.c. perp. deb. ...	93 — 98	+ 1
South Suburban 5 p.c. perp. deb.	120 —125	+ 1
United Kingdom ord.	21/6— 23/6	+ 6d.
Do. 4½ p.c. 1st cum. pref (x.d. May 14)	19/ — 21/-	— 6d.
Do. 4 p.c. 1st red. cum. pref. (x.d. May 14)	19/6— 21/6	— 6d.
Uxbridge, &c. 5 p.c. cap. (x.d. May 14)	127 —132	— 1
Do. 5 p.c. pref. (x.d. May 14)	104 —109	— 1

Gas Products Prices

The London Market

May 17.

There are no changes to report in the prices of Coal Tar products.

The Provinces

May 19.

Average prices for gas-works products: Pitch, 75s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6½d. per gall.; pure, 3s. 2½d. Prices for carbolic acid 60's anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.) and strained anthracene oil are controlled by Government Orders. Prices for road tar are increased by one penny per gall. by S. R. & O. 1947, 177, under which Order there are also increases in the prices of naphthalene.

Scotland

May 17.

Demand continues strong for all products.

*Refined Tar.** Yield to the distiller is 6d. per gall. ex works, naked. *Creosote Oil.* Timber preserving quality* 5½d. to 6½d. per gall. ; Hydrogenation Oil* 5¾d. per gall.; Low Gravity or Virgin Oil† 7½d. to 7½d. per gall.; Benzol Absorbing Oil 6½d. to 8d. per gall. *Refined Cresylic Acid* is 3s. 6d. to 4s. 6d. per gall. ex works, naked, according to quality. *Crude Naphtha*† 7d. to 8d. per gall. *Solvent Naphtha.** Basic maximum prices delivered in bulk 90/160 grade, 2s. 10d. per gall., and 90/190 Heavy Naphtha, unrectified, 2s. 0½d. per gall.; Rectified, 2s. 4d. per gall. *Pyridine.*† 90/160 grade 15s. per gall., and 90/140 grade 17s. per gall.

* Price controlled. † Uncontrolled

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